TECHNOLOGY DEPARTMENT

The Refrigeration Service Engineer

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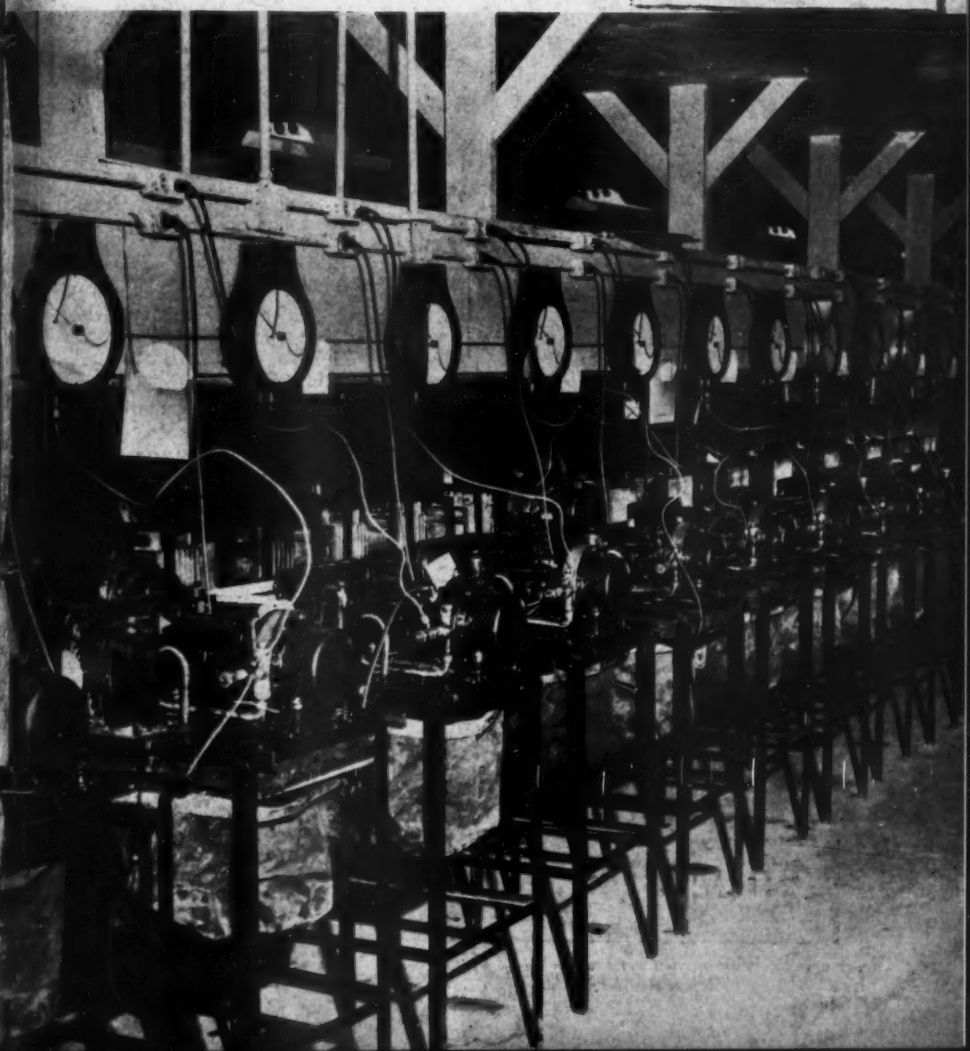
VOL. 15 NO. 8 ★ ★ ★ AUGUST 1947



CHICAGO SEALS

with

PRECISION LAPPED SURFACES

Combining highest human skill and scientific precision machine lapping, CHICAGO SEALS are accurately finished to

MILLIONTHS OF AN INCH

Careful inspection assures the highest quality and trouble-free operation.

FOR BETTER PERFORMANCE USE

CHICAGO VALVE PLATES

SOLD THROUGH LEADING

PERFECT BALANCE

Chicago Seals
MODERN DESIGN

CHICAGO SEALS

REFRIGERATION WHOLESALERS

CHICAGO SEAL CO. 20 N. WACKER DR., CHICAGO 6, ILL.

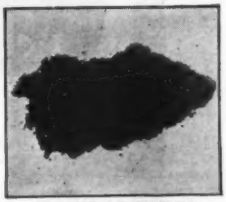
THE REFRIGERATION SERVICE ENGINEER, Nickerson & Collins Co., Publishers, 433 N. Waller Ave., Chicago 44, Ill. Published monthly. Vol. 15, No. 8, August, 1947. Entered as second class matter March 4, 1938, Chicago, Ill., under the Act of March 3, 1879. Subscription in the United States, $2.00 per year; all other countries, $3.00 per year.

The Ansul Research Staff
REPORTS ON:

SLUDGES

Approximately 90% of the sludges produced in refrigerating systems are due to moisture. The exact cause can always be determined by analysis, but the appearance of the sludge (see photos) is usually indicative of the cause.

SLUDGE DERIVED FROM MOISTURE— If water is present in a machine, the nature of the sludge depends upon the type of refrigerant and length of time the water is present. All refrigerants ... sulfur dioxide, methyl chloride, Carrene and "Freon-12" ... react with water to produce corrosion products characteristic of each. To prevent sludge, the amount of water present in a refrigerating system must be small enough to avoid ice separation and corrosion. For "Freon-12" and methyl chloride, a quantity of water approximately .05% by weight will cause corrosion; the limit is somewhat higher for sulfur dioxide.



GRANULAR SLUDGE
... due to moisture

SLUDGE DERIVED FROM OILS— Oil sludges are characterized by total or partial solubility in carbon tetrachloride, gasoline and similar solvents. It is generally presumed that oil sludges are due to two causes: (1) an interaction between the unsaturated constituents of the oil and the refrigerant; (2) a breakdown of the oil due to heat, oxidation, friction, etc.

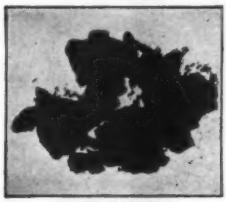
FLUID SLUDGE
... due to oil

SEND FOR "SLUDGES" by Ansul Research Staff
A detailed analysis of the refrigeration sludge problem.

ANSUL WHOLESALERS are ready and equipped to render an intelligent, cooperative service to refrigeration engineers and maintenance men on problems which arise from time-to-time in the operation of refrigerating systems.

FOR EXAMPLE:
The Ansul Research staff has developed a method for analysis of sludges. This analysis usually gives the answer as to the origin of the sludge. If you have a sludge problem, send a sample of the sludge with pertinent information to the Ansul Research Laboratory through your Ansul wholesaler. An analysis report will be made for you without charge.

Ansul Refrigerants are available at leading wholesalers everywhere.



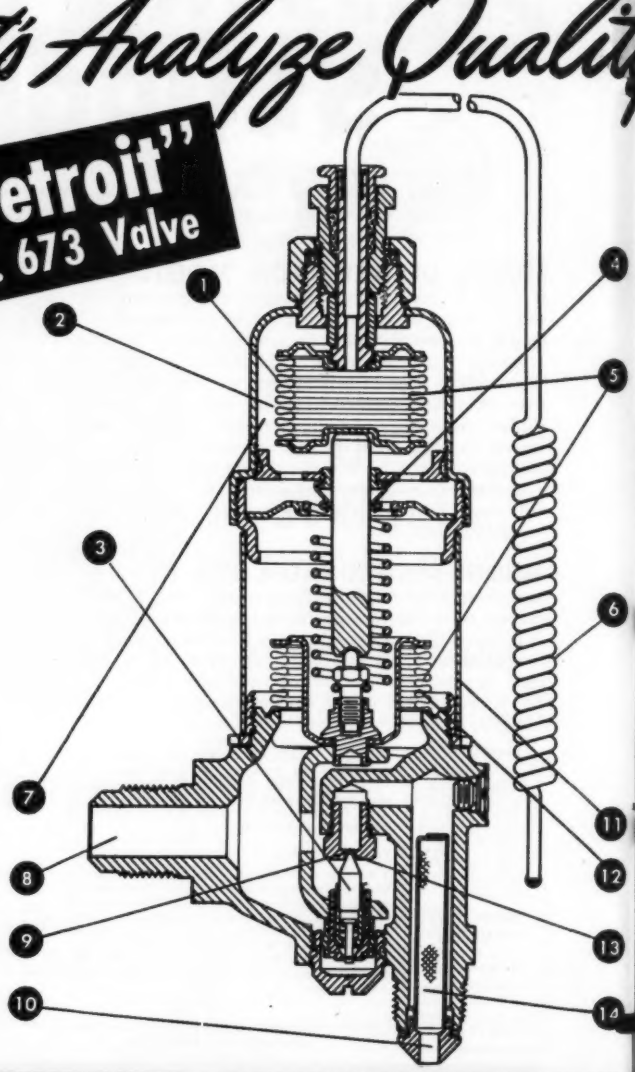
HARD SLUDGE
.. due to moisture and oil

*REG. U. S. PAT. OFF.

ANSUL CHEMICAL COMPANY
REFRIGERATION DIVISION, MARINETTE, WISCONSIN
DISTRIBUTORS FOR KINETIC'S "FREON-11" "FREON-12" "FREON-21" "FREON-22" AND "FREON-113"

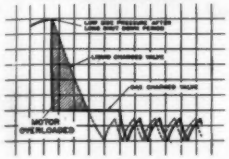
Let's Analyze Quality

"Detroit" No. 673 Valve

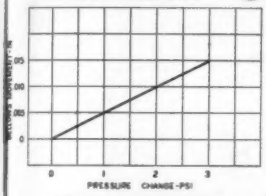


These Add up to Perfect Refrigerant Control

1 **GAS CHARGED FOR MOTOR PROTECTION**



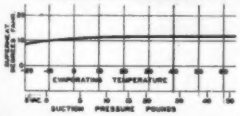
2 **BELLOWS FOR WIDE RANGE FLEXIBILITY**



3 **SWIVEL TYPE NEEDLE NO RUBBING—NO LEAKS**

4 **CONTROLLED FRICTION FOR ANTI-CHATTER**

5 **BELLOWS SELECTED FOR CONSTANT SUPERHEAT**



6 **FLEXIBLE COILED FEELER BULB MAY BE SHAPED TO FIT SUCTION LINE**

These Add up to Flexibility of Installation

7 **GAS CHARGED POWER ELEMENTS FOR HIGH AND LOW TEMPERATURE**

8 **STANDARD OUTLETS AVAILABLE—¼" FPT ⅜" OR ½" S.A.E.**

9 **STANDARD ORIFICES ¾64"—¾4"—3/32"—7/32"**

10 **INLET SUITABLE FOR ¼" OR ⅜" LIQUID LINE**

These Add up to Customer Protection

11 **STAINLESS STEEL SPACER WITH SILVER SOLDERED JOINTS**

12 **DURAFLEX BELLOWS**

13 **DELUBALOY NEEDLE AND SEAT**

14 **STRAINER FURNISHED WITH VALVE**

They all add up to **The Famous Quality of "Detroit" No. 673 Valve—"The Standard Of The Industry"**

DETROIT LUBRICATOR COMPANY *General Offices:* 5900 TRUMBULL AVENUE DETROIT 8, MICHIGAN

Division of American Radiator & Standard Sanitary Corporation

Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, MONTREAL, TORONTO, WINNIPEG

"Detroit" Heating and Refrigeration Controls • Engine Safety Controls • Float Valves and Oil Burner Accessories

"Detroit" Expansion Valves and Refrigeration Accessories • Stationary and Locomotive Lubricators

"DETROIT"

WHEN YOU RECHARGE

with Virginia SO_2

If you value your time, you should value Virginia "Extra Dry Esotoo," the sulfur dioxide that is consistently pure. When you recharge with "Esotoo," you take the first step in eliminating costly and time-consuming call-backs. Every cylinder is triple-tested to make certain that no dirty, oily or wet product will be shipped—reasons enough why "Esotoo" maintains its international reputation for high quality and dependability. VIRGINIA SMELTING COMPANY, West Norfolk, Va. *Established 1898.*

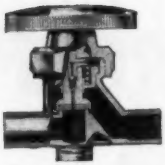
"EXTRA DRY ESOTOO"

Buy from Your Wholesaler

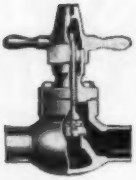
Distributors for
Kinetic's "Freon" Refrigerants

VIRGINIA *Refrigerants*

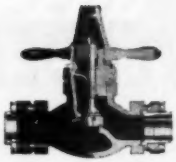
WEST NORFOLK • NEW YORK • BOSTON • DETROIT



PACKLESS VALVE
Parts-in-line. With or without balanced-action



WING CAP VALVE
Non-ferrous



WING CAP VALVE
Semi-steel—with adapters

AMMONIA VALVE
Bolted Bonnet—screw or flanged connections.
Also with screwed bonnet

you pay—

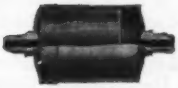
no premium for..

the extra advantages found in

Henry products

or for the extra satisfaction that follows their use!

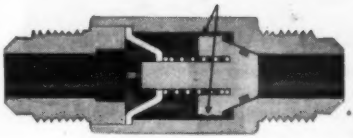
"Y" STRAINER
Welded steel with solder or F.P.T. connections



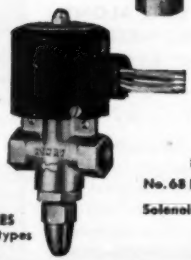
STRAINER
Soldered shell. Choice of mesh

DRIER
Refillable type with dispersion tube

RELIEF VALVE
Snap Action Relief Valve (Brass)



CHECK VALVE
New straight through flow (Piston guides not shown in order to illustrate flow passage)



SOLENOID VALVES
Freon and Ammonia types

... write for these catalogs:

No. 97 Packless and packed valves, strainers, driers, and other accessories.

No. 65 Ammonia valves and accessories.

No. 68 Drop forged and cold rolled steel fittings.

Solenoid Valve Booklet.

HENRY VALVE COMPANY

Control Devices, Valves, Driers, Strainers and Accessories for Refrigeration and Air Conditioning and Industrial Applications

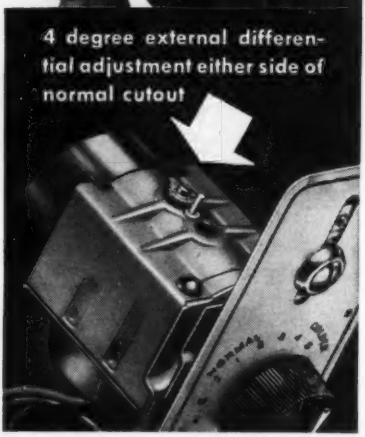
3260 W. GRAND AVENUE • CHICAGO 51, ILLINOIS Cable: HEVALCO CHICAGO

ALL NEEDED CONTROLS

FOUND IN THE CUTLER-HAMMER REFRIGERATION REPLACEMENT LINE

Sixty percent of all refrigeration control replacement requirements are met by one Cutler-Hammer control alone . . . the *Universal* Replacement Unit. And where specific control is needed, that need is met by Exact Replacement control items in the C-H line, each individually packed, clearly labelled, complete with dial plate mounting screws, trim washers and full instructions for mounting and adjustment.

The practical advantages gained are: less capital tied up in stock; rapid and regular turnover; speedier completion of each job; greater all-round satisfaction. And in each C-H Replacement unit you will find the results of a 50-year specialization that had led to acknowledged leadership in the control field. Thus, outstanding refrigeration wholesalers recommend C-H Replacement Control and alert service organizations everywhere feature and use it. CUTLER-HAMMER, Inc., 1363 St. Paul Ave., Milwaukee 1, Wisconsin.



Bul. 9521N9 ➔

THIS ONE UNIVERSAL UNIT ALONE COVERS 60% OF ALL NEEDS

ADJUSTABLE MOUNTING BRACKETS

Maximum Mounting Centers 4-3/16

Minimum Mounting Centers 2-3/16

Adjustable Cutout Feature—Differential can be increased 4 degrees by turning indicator in "Hi" direction and decreased 4 degrees by turning in "Lo" direction.

Adjustable Range—Turning screw clockwise lowers setting and counter-clockwise raises settings.

Operating knob can be adjusted to meet various evaporator scale settings. New knob is ideal for varying shield thicknesses. Makes *this* control adaptable to wider range of single dial replacement jobs where overload is not required in unit.

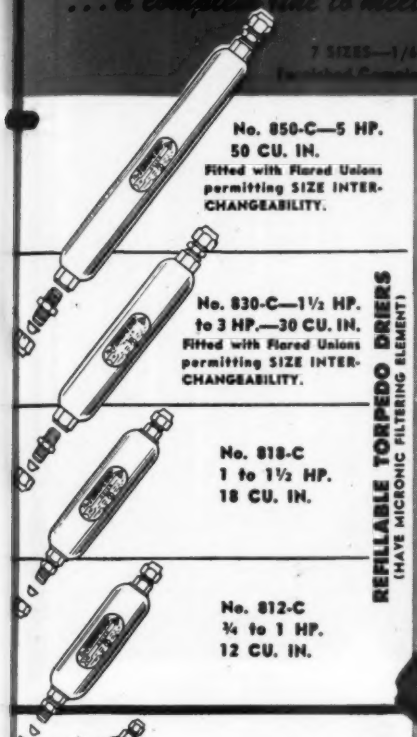
CUTLER-HAMMER
MOTOR CONTROL
C-H

DOMESTIC, SEMI-COMMERCIAL AND COMMERCIAL CONTROL

IMPERIAL *TORPEDO* DRIERS

. . . a complete line to meet all refrigeration applications

7 SIZES—1/6 to 5 HP.—3 to 50 CU. IN. Capacity.
Furnished Complete with Flare Nuts and Copper Seal Caps.



No. 850-C—5 HP. 50 CU. IN.
Fitted with Flared Unions permitting SIZE INTERCHANGEABILITY.

No. 830-C—1½ HP. to 3 HP.—30 CU. IN.
Fitted with Flared Unions permitting SIZE INTERCHANGEABILITY.

No. 818-C
1 to 1½ HP.
18 CU. IN.

No. 812-C
¾ to 1 HP.
12 CU. IN.

REFILLABLE TORPEDO DRIERS
(HAVE MICRONIC FILTERING ELEMENT)

No. 809-C
½ to ¾ HP.
9 CU. IN.

No. 806-C
¼ to ½ HP.
6 CU. IN.

No. 803-C
1/6 to ¼ HP.
3 CU. IN.

NON-REFILLABLE TORPEDO DRIERS
(HAVE FINE MESH MONEL METAL SCREEN)

Brazed—no soft solder joint that might loosen.
Easy to refill. Note generous surfaces for wrench hold.
Micronic filtering element.
One piece copper shell provides greater strength.
Silica Gel content and horsepower balanced.
Finger-type, fine mesh, monel metal screen of welded construction.
The TORPEDO DRIER
REFILLABLE TYPE

4 IMPORTANT IMPROVEMENTS
In Refillable Driers

1. New micronic filtering element is 3 times finer than ordinary screens . . . has more filtering area for longer operation without cleaning.

2. Large sizes have female flare threads fitted with male unions. This permits size interchangeability.

3. Two generous wrench holds make refilling very easy.

4. Capacities rated in accordance with REMA recommendations.

Now, more than ever, your best weapon in the war on moisture!

See Your Jobber

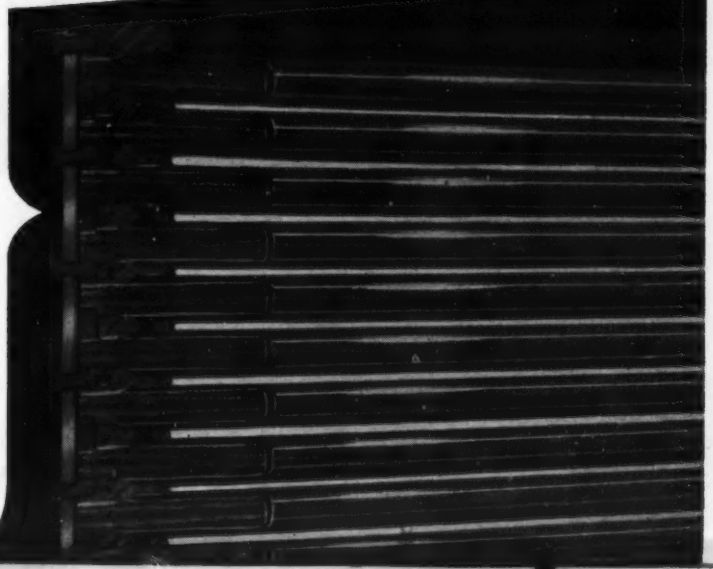
IMPERIAL

THE IMPERIAL BRASS MFG. CO.
634 S. Racine Ave., Chicago 7, Ill.

Fittings • Valves • Filters • Driers • Floats • Charging Lines • Tools for Cutting, Flaring, Bending, Coiling, Flash-Off, Swedging

DOUBLE-TUBE COUNTER-FLOW **CLEANABLE** WATER-COOLED CONDENSERS

Objective: **Operational Economy**



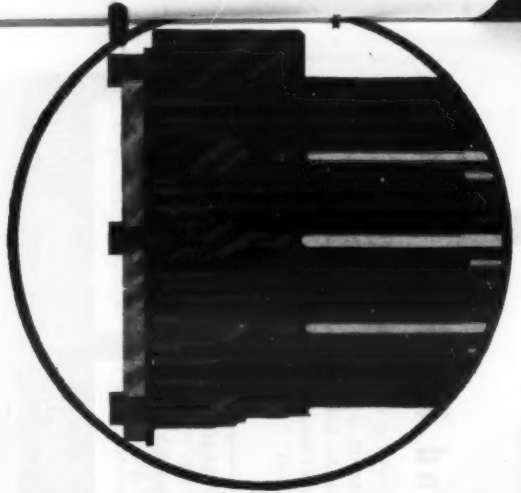
Answer:

HALSTEAD & MITCHELL'S

New **TWO-STAGE**

CONDENSERS

CONDENSERS



One of the surest ways to obtain economical condenser operation is to get the maximum heat-transfer capacity by taking the most heat from the refrigerant in the shortest period of time.

Halstead & Mitchell's New Two-Stage Condenser design makes possible greater concentration of copper water-tube surfaces in the lower portion of the condenser. The smaller top water tubes allow ample refrigerant space, thereby eliminating resistance or pressure drop and affording the lowest possible head pressures.

The new Two-Stage design improves refrigerant velocity and increases heat-transfer efficiency. Thus, with this construction, greater heat-transfer values are affected.

HM Condensers available from ½ to 10 H. P. from wholesalers in principal cities.

HM Cleanable Condensers can be maintained at "new-unit" efficiency and economy by regular and continued use of a standard cleaning tool. Water tubes are accessible at both ends—just loosen a few bolts and slide the end plates off—and there is nothing to obstruct the simple cleaning operation. The cleaning tool HAS to clean! Each quick cleaning operation takes only minutes, yet adds months and years of the most efficient and economical service to the life of the condenser.

HM

Halstead & Mitchell

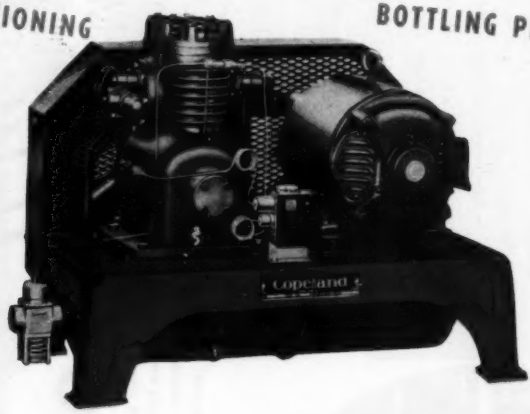
Wholesalers in principal cities *Write for descriptive literature.*

OFFICES: Bessemer Building, Pittsburgh 22, Pa.

FOR A WIDE MARKET

LOCKER PLANTS
AIR CONDITIONING
WALK-IN COOLERS
SLAUGHTER HOUSES
NURSERIES
AIR CONDITIONING
COLD STORAGE
DAIRY STORES
BAKERIES
FUR STORAGE
BOTTLING PLANTS

IMMEDIATE DELIVERY



Copeland 3, 5 and 7½ H.P. Units

Aggressive sales action can be followed up with prompt delivery, thanks to Copeland's production achievement. Cash in on the big, waiting market. Profit on these top values for locker plants, walk-in coolers, large food and dairy stores and air-conditioning installations. Order these 3, 5 and 7½ H.P. units today!

MODEL 303-W	MODEL 503-W	MODEL 750-WFH
3 H.P.	5 H.P.	7½ H.P.
$739.00 LIST	$1091.50 LIST	$1429.50 LIST
With Control—Less Starter	With Control—Less Starter	With Control—Less Starter

COPELAND REFRIGERATION CORPORATION, SIDNEY, OHIO

REMOVES SCALE

QUICKLY...
EASILY...
THOROUGHLY...
ECONOMICALLY...

USE
NU-COIL

Condenser Coils
Unit Coolers
Spray Heads
Refrigeration Drains
Valve Plates
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CLEAN coils, pipes, and drains with NU-COIL—keep them clear as a whistle . . . functioning like new! NU-COIL removes insulating deposits that increase head pressure and cause loss of operating efficiency. Scaled cooling tubes cleaned with NU-COIL perform with renewed operating efficiency . . . reduced operating costs.

NU-COIL is sufficiently mild for use on expensive light metals and precision fittings. NU-COIL is *easy* to *handle* . . . Requires no special handling equipment.

Available everywhere at the better Refrigeration Wholesale Supply Houses. Write today for FREE descriptive folder.

SKASOL CORPORATION
113 GLENCOE AVENUE • WEBSTER GROVES 19, MISSOURI

LET THIS DISPLAY REMIND YOU

. . . that THAWZONE and TRACE are two "musts" in protecting refrigeration systems and keeping them functioning perfectly with the minimum of attention.

THAWZONE, active, always circulating, destroys moisture chemically, economically, quickly and effectively in new, reconditioned or old systems.

TRACE is the highly effective refrigerant leak detector with the vivid red color that quickly spots leaks in any refrigeration system . . . new, old or reconditioned.

You will see this attractive display on the counters of leading refrigeration equipment wholesalers throughout the country.

HIGHSIDE CHEMICALS COMPANY

195 VERONA AVE., NEWARK 4, N. J.

RECORDED
PROOF OF PERFORMANCE

TEMPERATURE RECORDER

Standard Ranges
24 Hour Chart Rotation

—20° to +40°F.
—10° to +50°F.
30° to 60°F.
40° to 100°F.
70° to 130°F.

TEMPSCRIBE Recorders have many applications of practical value to stimulate sales of new appliances, promote customers' good will, and build profitable service business.

TEMPSCRIBE Recorders do what indicating instruments can't do—they give a 24-hour record of temperature and motor on-and-off time. There is no waste of time watching thermometer readings or clocking motor operation. Just leave your TEMPSCRIBE Recorders on the job for a time while you handle some other work.

TEMPSCRIBE charts—made before and after servicing—are tangible proof of an installation or service job well done. If the charts indicate that a complaint is due to abnormal use or improper location of the appliance, you have indisputable evidence on hand to explain the situation to the housewife, storekeeper, or plant operator.

In the show room, TEMPSCRIBE charts convincingly prove that temperatures in freeze chest and storage space are maintained within the desired range even at high room temperature.

TEMPSCRIBE Recorders may be used on practically any household and commercial refrigeration unit, such as dual-temperature refrigerators, home and farm refrigerators, refrigerated display cases, reach-in freezers, walk-in coolers, ice cream cabinets, frozen food cabinets, and refrigerating equipment used in food freezing plants and locker plants.

Convertible to Motor Operation Recorder, or Different Temperature Range, Simply by Changing Door

Any TEMPSCRIBE can be quickly converted to a different temperature range, or to a time-operation recorder, by replacement of the door that forms the front of the recorder. Door removal simply requires lifting out the hinge pin.

The pen of the Operation Recorder is actuated by an electro-magnetic armature, made for either series connection (plug-in connections shown at right) or for parallel connection. Either type has voltage range up to 250 volts, amperage range up to 20 amperes.

For refrigeration shop and service work a widely used TEMPSCRIBE combination comprises one clock case with spring-wound clock for 24-hour chart rotation and two doors (one with —20° to +40°F. temperature element, and one with mechanism for recording motor on-and-off time).

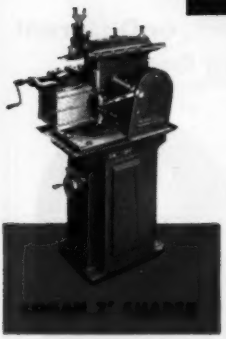
RECORDER for MOTOR OPERATION

Ask your jobber about TEMPSCRIBE, or write for Bulletin 731

BACHARACH INDUSTRIAL INSTRUMENT CO.
7000 BENNETT STREET • PITTSBURGH 8, PA.

LASTING ACCURACY

Another Reason Why More Industries Every Year Use Logan Lathes



The ability of the Logan Lathe to work to closest tolerances after years of usage results from advanced design and precise construction methods. The Logan ball bearing mounted spindle, for example, is constant in its accuracy through all speed ranges and under all operating conditions. Headstock bearing faces are held to an accuracy of .0005". Total spindle run-out 12 inches from the bearing is less than .0008". Bed ways are within .0005" of parallelism. Rugged, massive construction is combined with these precision standards. Vital points of the lathe are protected by self-lubricating bronze bearings. It is this careful building that gives the Logan Lathe its lasting accuracy. Full information on Logan Lathes and Shapers on request. U-2

SPECIFICATIONS COMMON TO ALL LOGAN LATHES . . swing over bed, 10½" . . . bed length, 43⅛" . . . size of hole through spindle, 25/32" . spindle nose diameter and threads per inch, 1½"—8 . . 12 spindle speeds, 30 to 1450 rpm . . . motor, ½ hp, 1750 rpm . . . ball bearing spindle mounting . . drum type reversing motor switch and cord . . . precision-ground ways, 2 V-ways and 2 flat ways.

DISTRICT OFFICES: Woolworth Bldg New York 7, N. Y Cortland 7-8024 • 550 W. Washington Blvd. Chicago 6, Illinois Central 1246 • 1672 Mission Street San Francisco, Calif Underhill 6682

LOGAN ENGINEERING CO. CHICAGO 30, ILLINOIS

"MAKE MINE THE GAUGE WITH THE RECALIBRATOR"...

That's the final verdict of refrigeration men who know their gauges and dial thermometers. They look upon the Marsh "Recalibrator" as a feature that makes a better instrument still better.

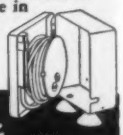
There is a good, solid reason for this: Every refrigeration man knows how difficult it is to avoid knocking gauges out of adjustment, particularly test gauges that receive rough handling in the tool kit and on the job. But when this happens to a Marsh gauge, you simply turn the "Recalibrator" screw as illustrated until the pointer coincides with zero. This, remember, is not merely re-setting of the pointer, for the "Recalibrator" is designed to actually re-establish the relationship between the bourdon tube and the movement. Thus it corrects the gauge at all points on the dial—the only basically sound way to do it.

Yes, it's reassuring to use these instruments that are so easy to keep on the beam. All are available with the "Recalibrator". Ask for handy booklet covering gauges and thermometers for refrigeration service.

JAS. P. MARSH CORP., 2057 Southport Ave., Chicago 14, Ill.
Export Department: 155 East 44th St., New York 17, N. Y.

Marsh Refrigeration Gauge —made in pressure, compound, and ammonia types.

Marsh Serviceman—remote reading service thermometer —now available in range —30°F. to +65°F. for work on quick-freeze units.



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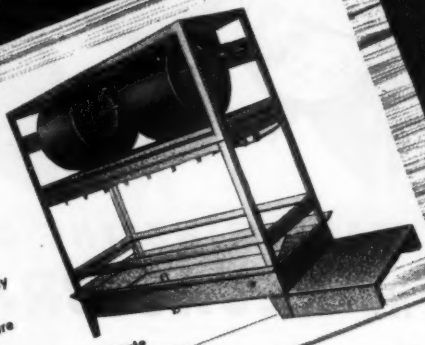

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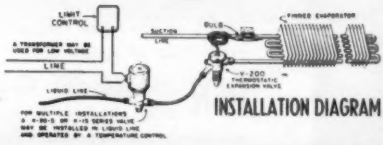

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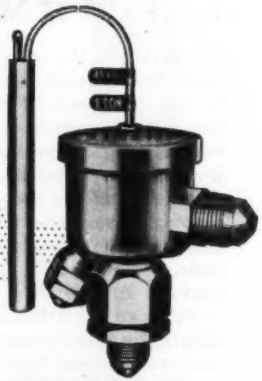

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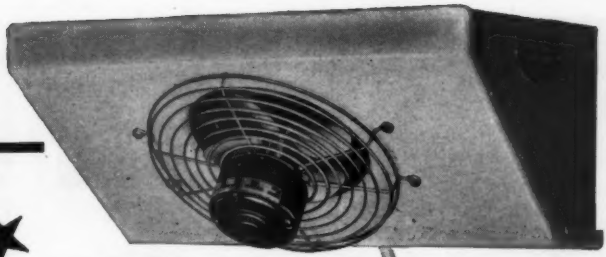

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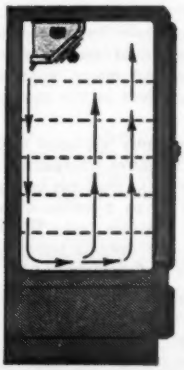

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with Air Purification

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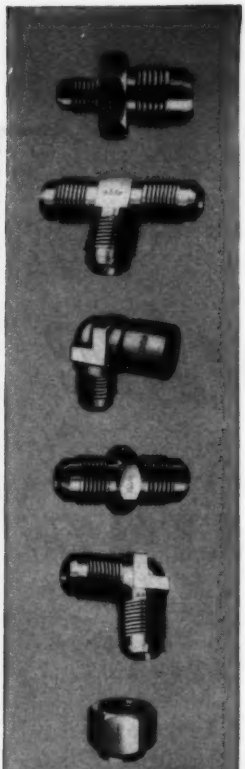

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BRASS CO.
PORT HURON
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YOUR REFRIGERATION WHOLESALER IS YOUR BUSINESS FRIEND

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MUELLER BRASS CO.
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● First as steel, Peerless created and now further improves the Gun Cooler line! Proved successful in thousands of installations, it reverses operation of conventional blower units by performing upside-down. Warm air is drawn into grill at top, chilled and poured gently out the bottom. It absorbs heat from the stored products and rises to be re-chilled by the Gun Cooler. A sound, effective cooling cycle! Installation is easy as hanging a clock!
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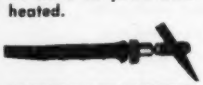
ATTACHMENTS
for handling all types of soldering jobs.

"PLIER" ATTACHMENT
For soldering applications where work may be held in jaws and heated.



"PENCIL" ATTACHMENT
For spot soldering where ground clamp may be attached to a metal part of work to complete secondary circuit.

"FORK" ATTACHMENT
For soldering in restricted spaces where straight tools cannot be used.

Operating on the *resistance heating principle,* the *new* Ideal "Thermo-Grip" unit heats 20% faster, concentrating heat at the point of application and conserving power. Adaptable to practically all soldering jobs —wiring, tubing, electrodes, sweating and unsweating threadless copper pipes, terminals, lugs, etc.

FASTER . . . **Heats instantly—1¼" copper pipe heated to soldering temperature in less than one minute.**

BETTER . . . **Handy "thumb-switch" permits close heat control. Modern design, light weight, compact, portable.**

SAFER . . . **All parts are fully insulated. Low voltage. No fire hazard.**

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✓	More Ranco Controls in Use
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The choice of leading refrigeration manufacturers, Ranco Refrigeration Controls are likewise the choice of refrigeration service men who demand dependable, satisfactory performance.

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The National Magazine of Refrigeration Sales, Service and Installation

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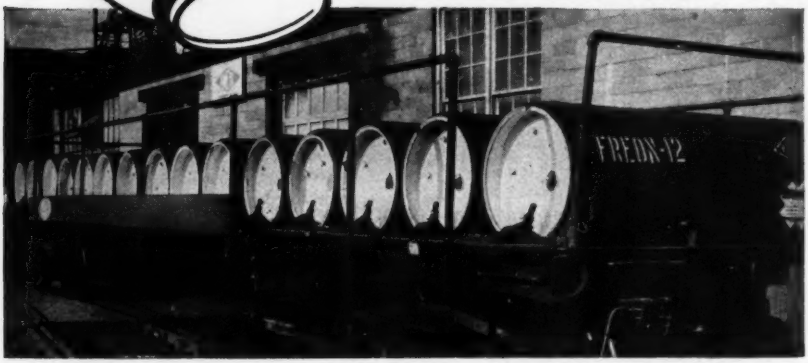
Moisture Content of "FREON" Now Less Than 10 Parts per Million



Carload shipment of 15 one-ton drums of "Freon-12" contains less than a cupful of moisture!

The sensational dryness of "Freon" refrigerants—now less than 10 parts of moisture in a million parts of "Freon-12"—is the result of extensive laboratory research. To produce these drier refrigerants, new equipment was designed and installed in the plants where they are made.

The need for a virtually anhydrous refrigerant stemmed from the increasing popularity of frozen foods. New, compact household quick-freezers and locker plant refrigerating equipment, designed to operate at lower temperatures, were needed to protect these frozen foods.

But since moisture in a refrigerant may freeze in the valves of low-temperature equipment, it was imperative that refrigerant moisture content be reduced to the absolute minimum. So now that "Freon" refrigerants contain practically no moisture . . . modern, compact, low-temperature quick-freezers, lockers and refrigerants are entirely practical and function safely, efficiently and economically.

Because "Freon" refrigerants *are* as dry and as pure as scientific methods of production can make them, they are ideal for all types of commercial, industrial and household applications. That is why refrigerating engineers everywhere heartily endorse the use of equipment designed to utilize "Freon." Kinetic Chemicals, Inc., Tenth and Market Streets, Wilmington 98, Delaware.

OUTSTANDING FEATURES OF "FREON" SAFE REFRIGERANTS

1. Freedom from moisture—now less than 10 parts per million.
2. Narrow boiling point range—confined within limits of 1/2°C.
3. Less than 2% of air in vapor phase.
4. Freedom from acids. There are none in "Freon".
5. Freedom from high and low boiling products.
6. Non-toxic . . . non-flammable . . . non-explosive.

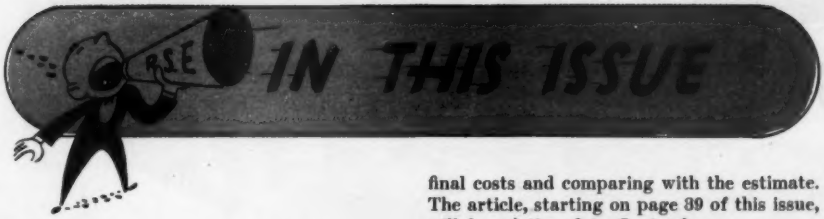
KINETIC

FREON

REG. U. S. PAT. OFF.

safe refrigerants

"Freon" is Kinetic's registered trade mark for its fluorine refrigerants and propellents.



MANY service companies these days are turning to monthly contract service as a means of leveling out their work and of assuring themselves of a definite income from their business. These contracts, of course, must be sold and the customer convinced of the value of such contracts to him. A powerful sales point and one of the valuable services you can offer through contracts is the savings to him in operating cost of his equipment. Under the heading "Servicing Equipment for Low Cost Operation," appearing on page 29, Edward Dowis discusses ways of reducing this expense.

EVAPORATIVE water cooling for condensing units is growing in popularity as the number of commercial installations increase. In fact it becomes a must in some localities where shortage or high cost of water demands it. After discussing the spray pond, cooling tower and forced draft tower in the July issue, P. B. Reed discusses "The Evaporative Condenser" appearing on page 34. In this article he provides application data, estimated savings in water consumption and service troubles which may involve the evaporative condenser.

IT IS rather late to be relating stories of what our GI refrigeration men did overseas during the war, but we felt that Oliver Rolf's story of how he built an "Army Ice Cream Plant" would still make interesting reading. You will find it on page 38.

IN THE fifth article of his series "Take the Guess Out of Estimating," Donald F. Daly begins a discussion of the difficult job of estimating a large rebuild or overhaul job. The job he uses as an example is a dining room and coffee shop in connection with a hotel. Beginning with his first contract with the job he describes the step by step procedure in inspecting, estimating the cost, making the repairs, figuring up the final costs and comparing with the estimate. The article, starting on page 39 of this issue, will be continued in September.

THE city of Hammond, Indiana, has recently passed a bonding and licensing law which, among other things, requires that a journeyman must serve four years apprenticeship before becoming eligible for a journeyman's refrigeration certificate of competency. A master mechanic must have three additional years of practical experience before being accepted as such. The complete ordinance begins on page 48.

THE best method of cutting open hermetics, how to make a "catch it" and other service hints are included in this month's Service Pointers, appearing on page 47.

WHAT clearance for pistons and does excess clearance cause oil pumping are two of the questions asked this month in the Question and Answer department on page 60. They are answered by the editor.

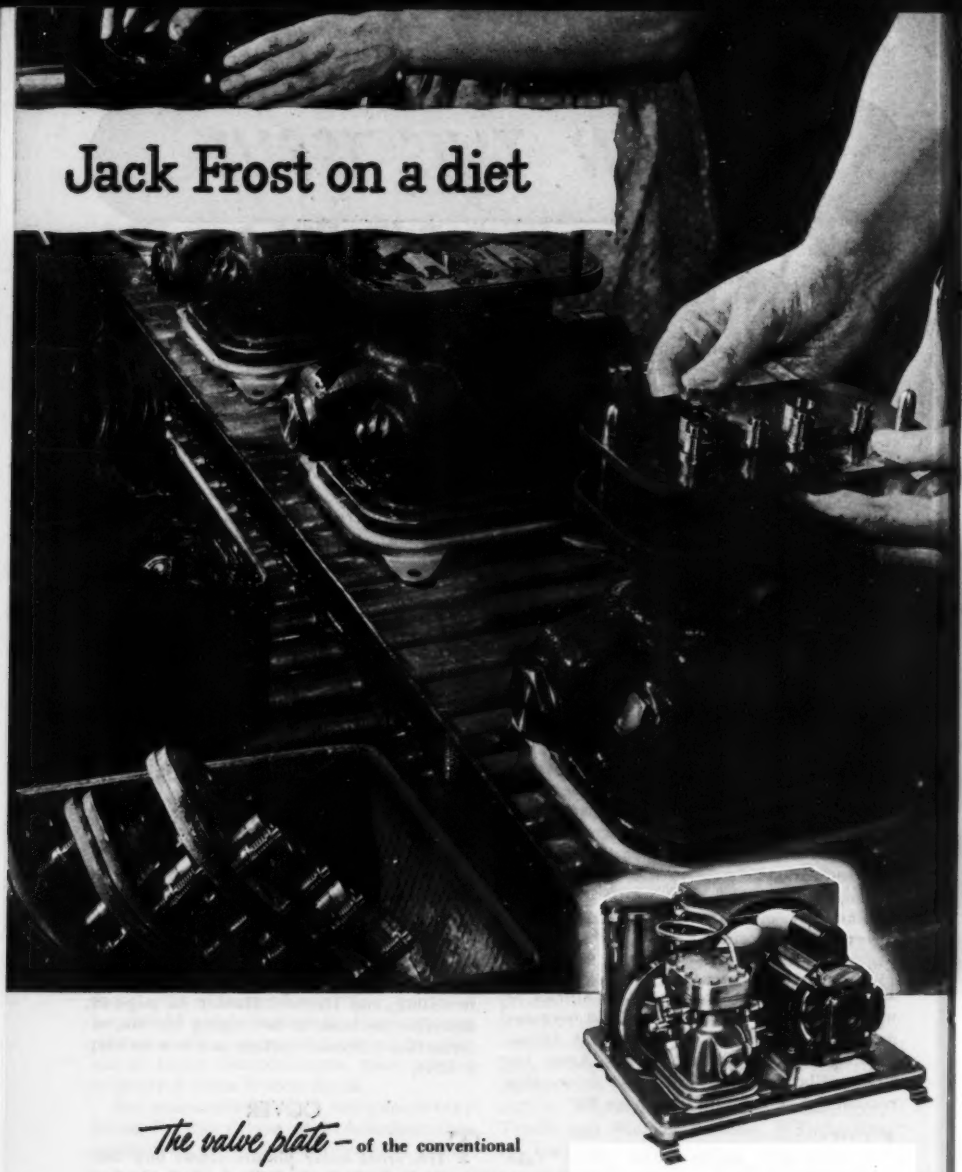
COMPETITIVE selling is on its way back and in anticipation of the day it arrives, records should be built up which will aid your selling force in getting your share of the business. A prospect file properly arranged and managed is one of the best aids to selling, and Herbert Hanley on page 49, describes methods of developing the file, information it should contain and how to keep it alive.

COVER

THE front cover picture shows how conduit and boxes were utilized in the original wiring distribution system feeding a refrigerator unit test rack in the service department of a suburban Los Angeles retailer of home appliances.

In order to secure greater flexibility and quick accessibility for occasional changes in wiring, this set-up was recently replaced with a 44-ft. run of Surfaceduct raceway.

Jack Frost on a diet



The valve plate — of the conventional condensing unit is made of cast iron. By making this part of hardened steel, Jack & Heintz engineers have obtained high strength and rigidity with *less thickness*. This slenderizing has reduced clearance in the discharge port, contributing to the *high efficiency* of J & H Condensing Units.

Better condensing units through

JACK & HEINTZ

Mass Precision

JACK & HEINTZ PRECISION INDUSTRIES, INC., *Cleveland 1, Ohio*

Best efficiencies are obtained with the highest suction pressure that will maintain desired conditions and with the lowest spread between suction and head pressures. Frequent checks of the pressures will save money for the owner.

Servicing Equipment for *Low Cost Operation*

By EDWARD DOWIS

FOR the man who has given thought to merchandising his service business when most of his customers have installed new equipment and when sales resistance begins to stiffen, here is a very profitable field. It is the servicing of good equipment to reduce operating cost.

Very few refrigeration and air conditioning systems are adjusted to operate at maximum efficiency. This means that good dollars are needlessly going for power and water bills and for maintenance: Dollars which the enterprising serviceman will be saving for his customers at a good profit to himself. In addition to profiting from the inspection and adjustment of the equipment, the service engineer will discover improvements which can be suggested, which should lead to more service work and the sale of equipment.

Here is a sales approach which even users of new equipment can not resist and a service they can not afford to do without. It is an article outlining methods of servicing refrigeration equipment for maximum economy of operation.

One reason for the large number of inefficient refrigeration systems in operation is that servicemen have had all they could do to keep the equipment in operation at all, with an insufficiency of help and many items of equipment necessary for economical operation unavailable. It is now time for us to refresh our "know how" in order to put these systems in an economical operating condition.

The cost of operating refrigerating equipment is considered, by most alert owners, under two headings:

1. Fixed costs:
   These include interest on investment, depreciation, rental value of space occupied, taxes, etc. which are relatively fixed but should be borne in mind by the serviceman because they are very important to the owner and may be the deciding factor in his decision on changes or purchase of additional or replacement equipment.
2. Operating costs:
   These are for electric power, water, maintenance, operating help for larger systems or time used by regular help in operating or maintaining.

It is the operating costs which concern the service engineer most directly and to these should be added the very important cost of spoilage and time consumed by the customer's employees in handling products because of improper operation of the equipment.

Electric and Water Costs

The cost of electric power and water, if used as the cooling medium, should be considered together because a decrease of one may mean an increase of the other. Maximum economy of water is secured by restricting its use and allowing it to heat to a high temperature in the condenser. This, however, increases power consumption, so the most economical operating pressure will be determined by the cost of electric power and the cost and temperature of the cooling water.

Water must be supplied in sufficient quantity to remove the heat withdrawn from the refrigerated space plus that added by the compressor, less whatever may radiate from cylinder walls and hot refrigerant lines to the air. Every pound of water supplied, removes as many Btu's as its temperature is raised in degrees. If water is restricted, the discharge water temperature will rise as the compressor discharges its heat to the smaller quantity of water. Higher condensing temperature means higher pressure and consequently higher power consumption. On the other hand, power consumption can be reduced by supplying more water, which will remove the same Btu per hour at a lower temperature rise and lower pressure, but the water bill will rise.

Perhaps the most accurate method of determining the cost per hour, for both water and electricity, is to install a watt meter in the power circuit and measure the water discharged at a number of discharge pressures. Power cost per hour will be

$$\frac{\text{watts} \times \text{cost per Kwh.}}{1000}$$

Water cost per hour will be

$$\frac{\text{gals. per minute} \times 60 \times \text{cost per 1000 cu. ft.}}{1000 \times 7.48}$$

or $\dfrac{\text{Gpm.} \times \text{cost per cu. ft.}}{124.66}$. Water supply is usually regulated by a water valve actuated by the high side pressure. Actually, this valve regulates the high side pressure by supplying more water as the pressure tends to rise, tending to keep the pressure constant. In practice, condensing pressure is regulated by the water valve setting. Suppose, for trial, the pressure is set at 125 pounds per square inch. A watt meter in the motor circuit reads 2750 watts and water is measured for 1 minute at 3 gallons: the electric rate is .03 per Kwh. and water $1.50 per 1000 cu. ft. Electricity will cost $\dfrac{2750 \times .03}{1000}$ or .0825 per hour. Water will cost $\dfrac{3 \times 1.50}{124.66}$ or .036 per hour, making the total cost for electricity and water .0825 + .036 or .1185. Pressures of 115 and 105 may then be tried, or higher pressures of 130 or 135 until one is found which will combine economy with good operating characteristics. Remember it is overall cost of both water and power which is important. The above pressures were suggested for Freon 12. Other refrigerants will, of course, be most economical at their usual operating pressures and tests should be made in that range.

Suction Pressure

Maximum economy of both power and water is secured at high suction pressure. Obviously the pressure has to be low enough to maintain desired temperatures, but the highest pressure which will maintain desired

conditions will be found most efficient. Among the conditions contributing to costly suction pressures are:

1. Frost laden evaporators; try to arrange a non frost or defrost cycle.

2. Slow air velocity past coil; correct improper baffling, check blower, see that produce does not obstruct air flow.

3. Coil too small for load or for compressor. If too small for the load it will have to operate at a needlessly high temperature difference; if too small for the compressor, running suction pressure will be needlessly low.

4. Compressor too fast: Indicated by low suction pressure and short running time; also high power consumption.

5. High superheat adjustment of expansion valve; indicated by relatively warm suction line temperature as compared to suction pressure.

Multiple Systems

Multiple systems with considerable differences in temperature of the various evaporators present special problems. A multiple system with a small low temperature evaporator and a large, higher temperature one, can not be efficient because the compressor must carry the larger, higher temperature load at a low suction pressure in order to satisfy the smaller low temperature evaporator. Economy demands that where large differences in temperatures of evaporators in multiple, are to be maintained, the lower temperature one should handle the larger part of the total load: It is still better to parallel evaporators with similar temperatures. Another condition to be avoided is a multiple system operating, much of the time, on only one evaporator. This gives the effect of an oversized condensing unit.

Compressor Efficiency

Compressor efficiency is stated as volumetric or overall. Volumetric efficiency is the ratio of actual volume of refrigerant handled and the measured displacement. Overall efficiency is the ratio of the power theoretically required by a perfect compressor and that actually required to do the same refrigerating job. These efficiencies are determined by:

1. The condition of the compressor.

2. The ratio of absolute suction and discharge pressures. The importance of this to the serviceman and operator is that the theoretical power requirement is lowest and the efficiency highest with the lowest spread between suction and discharge pressures.

Refrigerant Lines

Many refrigeration and air conditioning systems have refrigerant lines inadequate for economical operation. Ample suction line area is most important and should be large enough that pressure drop through the line will not exceed one or two pounds. This can be checked by comparing suction pressure at coil outlet and compressor at maximum load. Liquid lines must be large enough to supply liquid in sufficient quantity, but because of the lower specific volume and non-expansive properties of liquids, pressure drops in liquid lines may be as much as 5 pounds without seriously affecting efficiency.

Electrical Losses

Inefficiency in the electrical system is usually caused by worn bearings or a dirty motor, or inadequate wiring. A check of the motor is part of every routine inspection. Inadequate wiring will be indicated by a decided drop in voltage at switch terminals when the motor starts. Power loss indicated by low voltage is used in heating wiring and motor and may be a serious loss. Generally, if a choice is available, a higher voltage is more efficient than lower, and three phase current decidedly more efficient than single phase in larger sizes.

Evaporative Condensers and Cooling Towers

Where water cost is a considerable item, the relative cost of cooling towers or evaporative condensers should be considered. The best engineering advice available should direct a project of this kind. Where they are in use, however, attention should be given to spray heads, as restricted circulation requires additional power for pumping and retards cooling effect. Restricted air circulation also reduces cooling efficiency and, of course, the air supplied should be as dry as possible. Cost of power for auxiliary pumps and blowers is part of the cost of operation.

The possible savings in using city water during the Winter, when its temperature is low, and cooling towers or evaporative condensers in Summer, should be considered.

(Continued on page 88)

The Evaporative Condenser

By P. B. REED*

IN THE evaporative condenser, the cooling is almost entirely by evaporation, so that if the water were absolutely pure and clean, the only water that would theoretically be necessary to put on the coil is that vaporized, and this would only be about 2 or 3 per cent of that necessary for a water-cooled condenser. With pure water the cooling could be accomplished by very little water and the pump and pump motor could be much smaller.

Actually, however, a well designed evaporative condenser circulates much more than this minimum over the refrigerant coil. The ordinary water used contains mineral salts, dirt or other foreign matter. If the water all evaporated these solids would be deposited on the coil and would soon build up to a thickness that would act as an insulation. The heat transfer from the coil to the water would become less and less and eventually the discharge pressures would become excessively high.

To keep as much as possible of this foreign matter from being deposited on the coil, several times as much water is flowed over the coil as is evaporated—this tends to keep the coil washed cleaned. Nevertheless some sediment and scale does form on the coil and it is difficult to remove once it forms.

It has been found that if the coil is at a temperature below 125 F, these solids do not "burn" on to the coil, and are, therefore, kept washed off if as much as four or five times as much water as is evaporated is kept flowing over the coils. In one company's design, to take out enough heat to bring the hot gas temperature down to 125 F before it strikes the coil, the hot gas is first passed through an air-cooled coil similar to an air-cooled condenser. It need be only big enough just to cool the hot gas down to 125 F; that is, to remove some of the sensible heat of the gas.

One method of doing this is to place a small finned coil at the outlet of the air from the fan in the air stream from the evaporative condenser. A separate small finned coil with its own fan would serve equally well, so long as the hot gas from the compressor was cooled to 125 F or less before it passed into the main coil of the evaporative condenser.

Many evaporative condensers also have a liquid refrigerant receiver into which the liquid refrigerant drains and is stored after it is condensed in the refrigerant coil. One maker puts the receiver in the sump tank so as to keep the liquid refrigerant cool and thus obtain increased capacity. In some designs, separate motors are used on the fan and pump; in other designs, one motor is belted to and drives both the fan and the pump. The fans are usually the "squirrel cage" or axial type.

Second Article

In his first article the author discussed spray ponds, cooling towers, and forced draft towers, touching briefly on evaporative condensers. In this concluding article he describes the application of the evaporative condenser.

The air drawn into the evaporative condenser contains dust and lint and the water also has foreign matter of various kinds in it. This dust, scale, lint and other foreign matter collects in the water in the sump tank until finally it gets rather foul. Also small water plants called algae tend to grow in the water in the sump tank.

To keep the water reasonably clean, it must be constantly added to by fresh clean water. Some water must be added to make up for that evaporated and that lost by wind drift, but in many localities and locations this is not enough addition to keep the water clean. One common way of keeping the water reasonably clean is to set the float ball of the sump water make-up valve a little high so that it tries to keep the water level just slightly above the overflow pipe. In this way a little of the sump water is constantly going out through the overflow and is replaced by fresh, clean water. By adjusting the float ball height, the right amount of water required to keep the sump

* Chairman, R.S.E.S. International Educational and Examining Board. Talk given at 2nd Annual Wisconsin Association Convention.

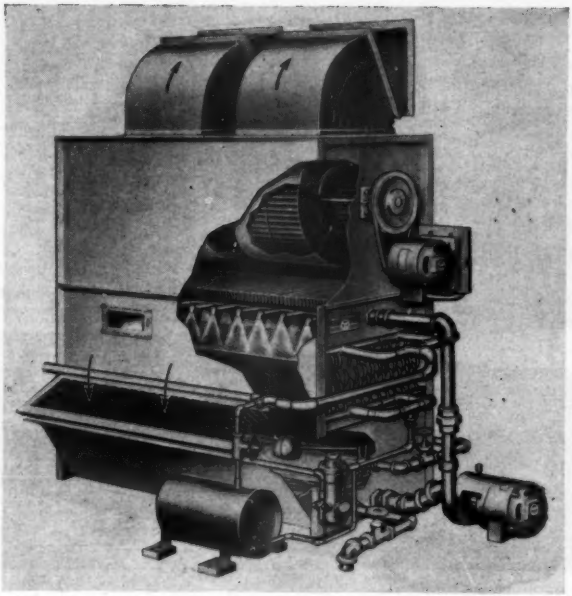


Fig. 6—Cut-Away View of Evaporative Condenser.

water clean can be established to maintain just the right amount of overflow.

In another method sometimes used if the compressors have water jacketed heads, some of the water from the pump discharge line to the spray tree, is led to the compressor and used to cool the jackets, then wasted to the sewer. The float valve in the sump tank will let additional water into the sump, to make up for the loss.

Not only is there a direct saving in the amount of water used in evaporative cooling, but in many parts of the United States, water from a spray pond, cooling tower or evaporative condenser may be much cooler than available tap water, so that there is in addition a gain in condensing unit capacity because of the lower discharge pressures obtainable from the cooler condensing water.

How cool can water be cooled by evaporation? The limit is the wet bulb temperature and discharge pressures usually correspond to temperatures about twenty degrees above the wet bulb temperature. Wet bulb temperatures vary from one part of the country to another, from season to season and from day to day. The wet bulb temperature that is used as a basis for selection of the equipment is what is known as the "design" wet bulb. It is not the maximum wet bulb that may occur in that locality, nor the lowest, nor even the average, but is a selected temperature a few degrees below the maximum so that the spray pond, cooling tower or evaporative condenser is large enough for most of the summer days but may cause some rise in discharge pressure on those days in the summer when the wet bulb temperature is the very maximum or at least over the design wet bulb temperature.

Wet-bulb design temperatures for various cities in the United States are available from tables published in the A.S.R.E. Data Book, the A.S.H.V.E. Guide and elsewhere. Table 1 is a small table for a few cities showing the design dry bulb, design wet bulb and the design temperature of city water in those cities and the "Freon 12" condensing pressures for evaporative cooling and for city water in water cooled condensers. The city water temperatures given are not maximum but normal for hot summer weather.

Table 1. Design Temperatures and "Freon 12" Condensing Pressures

City	Dry Bulb	Wet Bulb Temp.	Wet Bulb F12-PSIG	City Water Temp.	City Water F12-PSIG
Milwaukee, Wis.	85	75	117	60	100
Boston, Mass.	85	75	117	74	124
Tampa, Fla.	100	79	124	87	150
St. Louis, Mo.	95	78	123	85	146
Dallas, Tex.	100	78	123	82	140
Albuquerque, N. M.	105	66	101	72	120
Los Angeles, Calif.	90	70	108	76	128

In most of the Northern part of the United States, there is less advantage in using an evaporative condenser than in the Southern or Mid-Western areas. The greatest advantage is enjoyed in such climates as in the Southwest where the dry bulb tem-

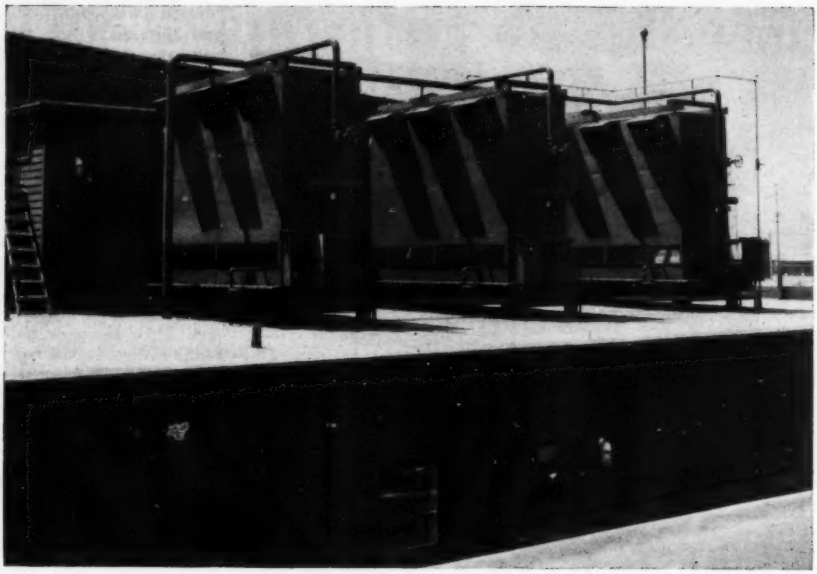


Fig. 7—An outdoor installation of Evaporative Condensers on the roof of an ice plant.

perature is high, the wet bulb temperature is low and the city water temperatures are fairly high and water rates high.

The dry bulb temperatures are shown to indicate the relative lead on the refrigeration equipment, and these temperatures must be considered in calculating heat leakage load, etc.

The wet bulb temperatures are the ones that control the condensing temperatures and discharge pressures that will be obtained. As comparison, normal "Freon 12" discharge pressures that can be expected are also shown for both evaporative cooling and for an ordinary shell-and-tube water cooled condenser. The pressures shown for evaporative cooling are based on a 25 F temperature difference between the wet bulb temperature of the air entering the cooling tower evaporative condenser and the saturation temperature of the refrigerant corresponding to the "Freon 12" discharge pressure shown. The pressures shown for city water are based on a 30 F temperature difference between the temperature of the city water entering the condenser and the saturation temperature of the refrigerant corresponding to the discharge pressure shown.

On a basis of 15,000 btu. per hour being the amount of heat to be extracted from the hot gas from the compressor per hour per ton, including the heat from the evaporator and the heat of compression, we can estimate that 5 gallons per hour per ton will be lost by the evaporative condenser, including the water evaporated, lost and entrained in the outlet air and wasted and replaced in order to keep the water from fouling. Compare this with the 72 gallons per hour for a water-cooled condenser with a 25 F temperature rise between inlet and outlet temperatures of the water.

Since the temperature to which the water is cooled by an evaporative condenser depends on the wet-bulb temperature, the effect of the temperature of the make-up water is negligible, so warm water may be used as make-up water.

The original cost of evaporative condensers keeps them from being used in the very small sizes. They are made and sometimes used in sizes less than 5 ton but their best field is in the sizes from 5 to 50 tons. They are made up to 100 ton sizes but they become rather bulky in the large sizes and from these sizes upward, spray ponds or cooling towers are used.

One of the desirable features of the evaporative condenser is its flexibility. It may be located either inside or outside the build-

ing. In the southern part of the United States evaporative condensers are usually placed just outside the building (as in Fig. 7), and as near the condensing unit as possible, so as to avoid the possibility of flash gas forming in the long liquid line from the receiver to the expansion valve. Even in the Northern states, where freezing temperatures are common in the winter, evaporative condensers are often located outside the building. Many are connected to air conditioning systems that are unused in the winter, so the evaporative condenser is pumped down, and the water drained from it.

Evaporative condensers can be used in below-freezing weather by draining the water from them and operating them as air-cooled units with the cold outside air circulated through them the same as before, but the refrigerant coil cooled by air instead of by water. Evaporative condensers are often housed in special enclosures provided with adjustable louvers or windows, on the roofs of the buildings with the condensing unit either in the basement, if the building has only a story or two, or in an adjacent room.

Location

A favorite location for evaporative condensers, especially of the smaller sizes, is the basement, in the same or adjacent room as the condensing unit. A duct is run from the air discharge from the fan to the outside. In the small sizes the inlet air is taken from the basement but in the larger sizes this means such a rapid air change in the basement that it may impose excessive loads on the winter heating system or be objectionable for other reasons, so the intake air to the evaporative condenser may be ducted from the outside.

Some installations take advantage of the fact that the evaporative condenser is a heat removing device. The duct-work is so arranged that in the winter the heat-laden outlet air from the evaporative condenser may be used to warm machine rooms or other areas, thus saving fuel for the regular heating system. This system can be used to very good effect especially when the refrigerant condensing coil of the evaporative condenser is working without water in the winter and is being cooled by outside air.

Preferably each Spring and Fall, but at least each Spring, the evaporative condenser should be given a complete inspection; eliminator plates cleaned, the sump drained, scrubbed out with a washing soda solution and refilled. The coil should be cleaned, spray nozzles cleaned, motor, pump and fan checked and bearings oiled, belts tightened and tightness of fans to fan shaft inspected.

Other than ordinary mechanical troubles, breakage, noise, etc., the main source of service calls on evaporative condensers, is high head pressure. Table 1 shows the normal discharge pressure that should be obtained from a properly installed evaporative condenser correctly balanced to its heat load.

The wet bulb may be checked with a sling psychrometer or by improvising one from a pocket thermometer with a small wetted cloth or piece of cotton wrapped around the bulb and whirled at the end of a short cord.

Causes of High Pressure

If the discharge pressures are much above those shown in the table, the cause can be traced to one of the following conditions:

1. Poor heat transfer from water to coil. Coil dirty or encrusted with scale.

2. Not enough air. Eliminators dirty, ducts or grilles dirty, fan belt slipping, low voltage to fan motor, loose pulley, fan motor running in wrong direction, ducts too long or too small causing high static pressure.

(Designs vary greatly but good practice usually requires 180 to 240 cubic feet of air per minute for each one ton capacity of the evaporative condenser.)

3. Too little water. Water pump not working properly, pump belts slipping, pump motor running slow due to low voltage or running in wrong direction (not uncommon with three phase motors), pulley loose, spray nozzles plugged or obstruction in water lines.

4. Air in the system. To check this, check coil temperature with a thermometer taped to the coil, and the discharge pressure. Do this after a shut-down of several hours such as, early in the morning before the system is started up for the day (if on an air conditioning system). The pressure and temperature should compare with the saturation pressure temperature chart for the refrigerant used. If the pressure is too high, purge the system of air from the condenser coil, the compressor head, the evaporator outlet or other high points in the gas part of the system.

5. Overcharge of refrigerant. Check the amount of liquid in the receiver and remove refrigerant if it is over ½ full of liquid.

Some of the evaporative condensers made in recent years have been constructed mostly

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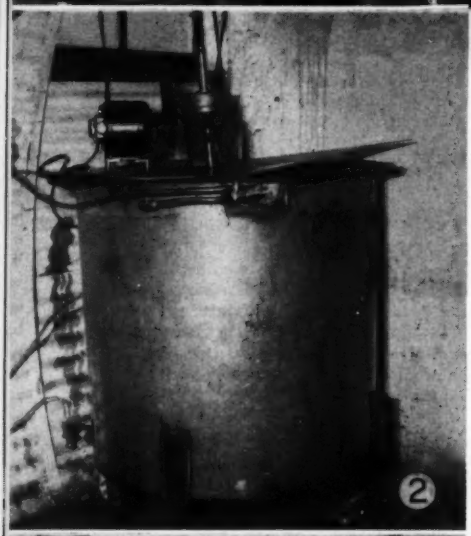
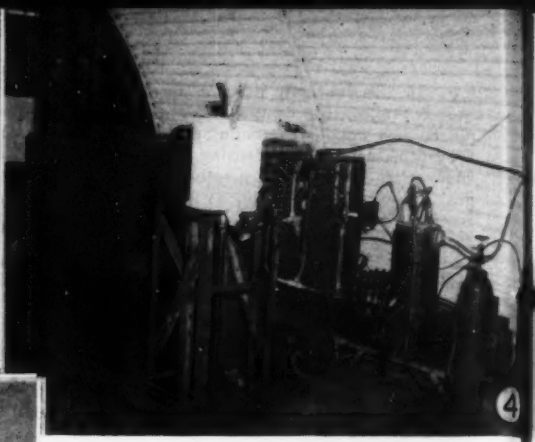




Army Ice Cream Plant "Custom Made"

By OLIVER ROLF
Schenectady, N. Y.

ANYTIME you tell an American "It can't be done," you are headed for a surprise. This article, though a little late for such stories, will in part prove the above statement. It is a story of what our GI's did overseas besides drinking the English "mild and bitters." The product hatched by one GI (namely me) was a fully automatic mechanical ice cream plant capable of freezing 5 gallons of ice cream every 7 to 10 minutes up to 235 gallons per day, which was the capacity of the hardening cabinet. This plant supplied enough ice cream for a station of about 2600 men, an army general hospital with maximum capacity of 1800 men and various other small detachments. Average serving per man was a pint. The Army authorized the making of ice cream overseas and supplied dehydrated ingredients but equipment was unobtainable. This was overcome by building an entire plant. With the exception of compressor,

(Continued on page 86)

The four pictures on this page show: 1—The brine tank for the hardening cabinet under construction at the Army depot. 2—The stainless steel mix storage and cooling tank with the bomb-hoist reduction gear on top. 3—The author running off a batch using an improvised gasoline gate valve as a draw off gate on the freezer. 4—View of the plant showing freezer, hardening cabinet and a condensing unit.

By DONALD F. DALY

ESTIMATING A LARGE REBUILD OR OVERHAUL JOB

THERE are many problems involved in estimating a major rebuilding or overhaul job that do not come up in estimating a new installation. In most cases the largest single item in a rebuild operation is labor. Then too, it is much more difficult to estimate the material and labor on such jobs because there are so many unknown factors.

With a new installation you know what material and equipment is required and approximately how much labor it will take to do the work. But in a rebuild or overhaul job it just isn't possible to lump certain sections of the work together and arrive at a safe cost estimate by using a percentage of the material cost to figure the labor factor. In overhaul work the estimator has to be very careful or he may find that he has overlooked items of great importance.

I think the best way to illustrate how to go about estimating such jobs is to take a typical installation and show, step by step, how one successful contractor handled such a job. I must repeat once again that the method I present in this article is just one way of doing such estimating. There may be other, and better ways, but for what it is worth, here it is.

A few months ago the company I work for was asked to bid on the overhaul of a good sized commercial refrigeration plant. This installation was in a dining room and coffee shop that was run in connection with a large hotel. As the senior service engineer for my company it fell to my lot to make the preliminary survey of this plant. This was the usual procedure with this outfit. In most cases, if it didn't involve too much, this estimate was used in submitting the bid. However, if it was a very large job, or if the serviceman was in doubt, the engineer would go out to check the estimate.

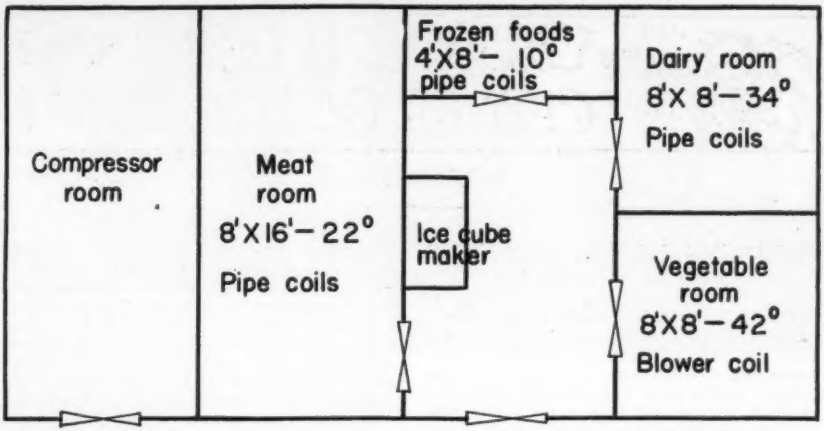
My orders were to find out definitely what the owner had in mind and to make an estimate of the work required. I went out to the place and before I looked up the owner I took a quick look around. The plant was shut down so I couldn't tell much about its operating condition. It looked like a very fine installation that had been sadly neglected. I don't think the plant was more than four or five years old but it was covered with grease and dirt. The refrigerated boxes were in good condition as far as coils and insulation were concerned, but they too were dirty and grease covered.

Fifth Article

Estimating the cost of overhauling a commercial system is not easy and takes more than a quick look around and a healthy guess to make sure you are going to come out on the right side of your ledger. How to break down your estimate and one actual experience of estimating and completing a job is described in this article. It will give you first hand information on how to go about it.

The plant was in the basement and the condensing unit was a Carrier Model 7 H 5 driven by a 7½ hp. motor. It had a water cooled condenser which was mounted on the wall just above the compressor. The piping arrangement was conventional in every respect. The cooling water was pump circulated and the small cooling tower was on the roof of a one story extension of the main building. The water pump and cooling tower seemed to be much newer than the rest of the plant and was in very good condition.

The refrigerated rooms were along the inside wall of the basement just across from the freight elevator. The refrigerated space was 16' deep by 24' long and had a 9' ceiling. The left hand section was 8' x 16'. The center section was a vestibule with a frozen food box at the far end which was 4' deep x 8' wide. The right hand section had a milk and dairy room 8' x 8', and a vegetable room that was also 8' x 8'. All doors opened off the



vestibule. The meat room, dairy room, and frozen food room were cooled by pipe coils. The vegetable room was cooled by a blower coil. There was a large ice cube maker in the vestibule. The condensing unit was set at one end of the refrigerated room in a walled off space. It was evident that some one who knew his business had engineered and designed the plant for convenient and economical operation.

The kitchen was on the main floor just above the plant. It had one of the largest reach-in boxes I have ever seen. It occupied all of one wall of the kitchen and had two rows of ten doors each. This box was cooled by two finned coils in a bunker at the top. It also had eight turns of ½" copper tubing just under the center shelf. There was no drip pan under this lower coil so I imagine it was more or less in the nature of a dryer.

The dining room was divided into two sections. One side given over to tables and the other side to a coffee shop. There were no units in the dining room, but the coffee shop had a salad pan; an eight hole ice cream serving cabinet, and a water cooler. All three of these fixtures had its own condensing unit. That was all the refrigeration I could find so I decided it was time to look up the owner.

I found him in his office, and after introducing myself, I asked him what he had in mind in the way of repairs. He told me that he had just taken over the restaurant and had closed for a complete remodeling and redecorating job. He didn't know anything about the refrigeration plant. He had tried to start it up, but couldn't get any refrigeration. Apparently there was something wrong. "Out of gas," he supposed. But whatever it was, he wanted it fixed up and in good operating condition before he opened. He expected to open for business in thirty days.

I asked him if he wanted this work done on a time and material basis. He very definitely wanted it on a contract basis. It seems he had signed contracts for all the remodeling work, but most of the contractors had insisted on an escalator clause. Consequently, he had been getting stuck. Some of the material and equipment was not available and substitutions had to be made. These substitutions had run away over the original figure and this had made him a very unhappy man. No. The work would have to be strictly on a contract basis.

I pointed out that there were many unknown factors involved in overhauling a plant of this size. In order to protect ourselves we would have to figure pretty high. That it might be cheaper for him to have the work done on a time and material basis. He wouldn't hear of this. He had already been stuck, "and by Heavens it wasn't going to happen again." He had invited several refrigeration outfits to figure the work. If we wanted to submit a bid it was all right with him. If we didn't that was all right too. (A very unhappy man.) I told him I would make an estimate and let him know as soon as possible. As I passed through the coffee shop I plugged in the three self contained units. I decided to start with the reach-in box.

Breakdown of Estimate

From this point the problem of estimating becomes much the same as on a new installation. Except that you have to be more careful and you have to break the job down into as many individual operations as possible. Before figuring costs it is necessary to know just what work has to be done. The best way to do this is to split the plant up into several sections and make a separate list for all work to be done on each section. You'll have to guess on some things, but that can't be helped. Just don't make wild guesses. And don't rely on your memory. Put it all down in writing on your lists. These lists are very important and you can well afford to spend a little time on them. They can be used as a job record sheet and as a specification sheet.

The coils and piping in the reach-in box seemed to be in good condition, but some of the hardware had to be replaced and all of the door gaskets would have to be renewed. The inside of the box would have to be scrubbed down and shellacked. I made notes of this on my list.

When I finished going over the reach-in I figured that the three self contained units had been in operation long enough to show some indication of their condition so I checked them next. The water cooler seemed to be in good condition. The water was down to 42 degrees and it had cut-out. I ran quite a bit of water and it cut-in at 46 degrees. The cycle seemed to be about normal, but the condenser was dirty and the unit space was full of dust and lint and the usual scraps of paper. I made a note to clean unit and oil motor.

The ice cream cabinet wasn't doing so well. Frost had formed on only part of the plates and there was quite a lot of oil around the unit. I figured the seal was leaking and that it probably needed a new valve plate. To be on the safe side I put on my gauges and checked it. It checked out about as I figured so I put these items down on my list.

The salad tray was really sick. It had been running for more than an hour with no results. Examination showed that the belt had been slipping, but when I tightened the belt the motor wouldn't take the load. That meant a motor overhaul or a new motor. (At this time it is cheaper to buy a new motor than to have the old one fixed up. That is, if you can find a new motor. Usually you can't.) The water cooler had the same motor base as the salad tray so I exchanged them. I put on my gauges and checked the unit, but it still wouldn't refrigerate. It seemed to be the expansion valve that was bad. The compressor pulled and held a vacuum and it seemed to have plenty of Freon. I put all this down on my list.

The Basement Rooms

Now I was ready to go down in the basement and start the toughest part of the estimating. I decided to leave the unit until last and go over the rooms. All of the piping, pipe hangers, and insulation, seemed to be in good shape. There was a broken hinge on the vestibule room door and a broken door latch on the frozen food room door. The gasket and inside seal had to be changed on all doors. The boxes were dirty and the walls, floors, and ceilings would have to be scrubbed down and shellacked. The fan on the vegetable room blower coil came up to speed quickly so I called it O. K. As far as I could determine the ice cube maker was all right. I added these items to my list.

Now for the condensing unit. First I checked all the valves and then started the motor. It seemed to run pretty good. but there was quite an arc between the brushes and the commutator. Further check showed that there was too much end play in the shaft and there was some indication that the bearings were worn. I put down a minor overhaul on the motor. The belts were worn so I put down five 85" belts.

There weren't any gauges on the unit so I put mine on and found the pressure balanced off at about fifteen pounds. Evidently most of the refrigerant was gone. I put down 145 lbs. of Freon 12. Next I checked the pressure switch. It cut out at three pounds and cut in at eighteen pounds. This was about right. The high pressure switch cut out at 160 pounds. This too, was near enough. I closed the suction service valve and pulled a vacuum on the crankcase. The valves didn't hold, even with a pressure of only fifteen

pounds. I put down a valve plate exchange, new suction reeds, and new piston rings. I rocked the compressor back and forth by hand and as far as I could tell the bearings were O.K. I added two gallons of oil to my list and went on to the next section.

Since the plant was not operable I couldn't tell much about the valves and controls, but with seven expansion valves; a solenoid valve on the meat room, one on the dairy room, and one on the reach-in box, and a suction regulator valve on the vegetable room (the frosted food room and the ice cube maker had no auxiliary controls), I figured that at least a couple of them would be haywire. So I put down one expansion valve and one solenoid valve. The expansion valves were all Alco removable cage type so I figured on changing three cages.

Look for That Leak

I knew the refrigerant must have gotten out somewhere so I lit up my leak detector and made a quick check over the plant. Fifteen pounds wasn't enough pressure for a good test, but in a close place with no ventilation, I figured I could pick up any large leaks. I suspected the shaft seal, but could get no reaction there. I went over every part of the system in a hurry, but couldn't pick up a trace anywhere. Well, it must have gotten out somewhere. There was no possibility, but I didn't like to think about that.

I clicked the switches on the solenoid valves and they seemed to open and close O.K. They were a little sluggish, but this could have been due to oil. I decided to open up one of the expansion valves to see what condition it was in. There was some oil trapped in the body, and while I couldn't be sure, I thought I found a trace of water. There was only one strainer in the whole system. A large one in the liquid line just after it left the receiver. It was a bolted type and could be used with either a dryer or a strainer cartridge. I assumed that it had a strainer in it now. To make sure I unbolted the cover. It had a strainer in it all right, and it also had nearly a cup of water. Oh. Oh. This complicates things. It sure looked as though the Freon had gotten out through the condenser.

Well, I may as well find out now as later. I unscrewed one of the plugs out of the condenser head at the high end. Sure enough I got a strong reaction with my leak detector. So strong in fact, that it put the torch out. That was that, and it sure made a change in my estimating problem. I decided to figure the original repair work first and then figure the work and material required to dry out the system separately. If a tube were gone, which must have been the case, it meant replacing or retubing the condenser and the water must be pretty well throughout the entire system. The owner was going to be even more unhappy when I told him this news.

The water pump, water pump motor, water piping, and evaporative cooler were all in good condition and had been recently painted. The fan in the evaporative cooler was also running O.K. I listed all the needed material. The motor, 7½ hp., would have to go to an electrical shop as we did not do anything but minor electrical repairs.

Now comes the estimate for cleaning and drying the system. This is a pretty difficult operation. Obviously it would have to be done with all the various parts of the system in place. It just isn't possible to dismantle a plant of this size and bake it out as is done with small units. The first step would be to fix up the old condenser, or put in a new. I figured on a new one. The next step would be to blow out the entire system with nitrogen. The lines would have to be cut in several places as it would not be possible to blow the water out of the entire system at one time. Then we would have to pull a vacuum on the system for at least forty-eight hours. If it came dry at the end of this time we would run a scrubber, or system cleaner as they are sometimes called, for another twenty-four to thirty-six hours. Of course we could be doing other work while evacuating, but while the scrubber was in operation one man would have to stand by all the time. I listed all of the parts and material that would be needed for this operation.

It takes a long time to tell about all this, but actually I was only out there about three hours. Many estimators do not go through all this step by step checking. They just take a look around and then figure that a routine check and overhaul will come to a certain amount. Usually basing their figures on the number of fixtures. This works out pretty well where the estimator has had lots of experience and enough completion records on similar jobs to set up cost factors. However, on this particular job such an estimate would surely have overlooked the fact that the system was wet. It sometimes happens that a contractor does miss some such condition in making an estimate, and of course he loses money. In the case of a large contractor it can be written off, and his large volume of business will let him average out. But to a small operator such an oversight might mean disaster.

(To Be Continued)

City of Hammond Ind. Ordinance Includes Bonding, Licensing Law

The following ordinance, recently passed in the city of Hammond, Ind., is published for the sake of the information it will provide readers in other cities and states who may be interested in formulating an ordinance of their own. Considerable interest is being displayed by many groups, of late, in licensing and regulatory laws governing the installation and servicing of refrigerating equipment. Ordinances now in use, such as the following, may offer some suggestions and help in forming others in cities now considering legislation.—*Editor.*

AN ORDINANCE creating the Examining and Supervising Board for refrigeration mechanics, designating its members and prescribing their powers and duties, bonding and licensing those engaged in the refrigeration business; providing for refrigeration inspectors; creating the Office of Refrigeration Inspector and prescribing his duties and powers; requiring those engaged in refrigration work to be certified and registered with the city; requiring permits for certain refrigeration work; providing for the manner of installation; the minimum safe limits for the transfer and storage of refrigerants; repealing all the ordinances and parts of ordinances in conflict herewith and declaring an emergency.

Be it ordained by the Common Council of the city of Hammond, Indiana:

SECTION I—DEFINITIONS

A—Refrigeration as referred to in this Ordinance shall mean the process or act of removing heat from any substance or space in a manner involving the expansion, vaporizing or liquefying and/or compression of a gas or fluid.

B—Refrigeration equipment as referred to in this Ordinance shall mean any appliance, apparatus, device or assembly of parts, tubes, fittings, tanks and/or machines used to confine, conduct, vaporize, liquefy and/or compress a liquid or gas for the purpose of refrigeration.

C—Refrigeration work as referred to in this Ordinance shall mean the act of constructing, installing, moving, altering, repairing and/or servicing any refrigeration equipment as referred to in this ordinance. No part of this ordinance shall be construed to prohibit, control or regulate the manufacture, rebuilding, fabricating or assembling of refrigeration equipment within any plant or on the premise of any manufacturer, rebuilder, fabricator and/or assembler of refrigeration equipment.

D—Refrigeration system as referred to in this Ordinance shall mean all the machines, compressors, devices, equipment, connections, fittings, pipes, tubes, coils and controls containing or used to conduct a liquid or gas refrigerant which in its vaporizing or condensing cycle is used to extract heat for the purpose of cooling any substance, or space either for the purpose of food preservation, comfort air-conditioning or industrial processing.

E—Business of refrigeration as referred to in this Ordinance shall mean the act of offering for sale, trade or lease any refrigeration equipment, such business establishments subject to licensing and bonding.

SECTION II—BUSINESS OF REFRIGERATION

Every person, firm or corporation desiring to engage in the business of selling, leasing, constructing, installing, altering, disassembling, repairing and/or servicing any refrigeration system or equipment as defined in this ordinance in any building, structure public or private premise or grounds within the City of Hammond shall first file with the City Controller an application to engage in said business, pay a license fee, post the bond, and in certain instances as hereinafter prescribed, qualified by examination for a certificate of competency to do certain work.

SECTION III—BONDS

Before approval of such application to engage in said business applicant shall give a good and sufficient Surety Bond in the sum of One Thousand ($1,000.00) dollars, executed by a recognized Surety Company to be approved by the Board of Commissioners, payable to the City of Hammond and conditioned that said applicant will comply in good faith with all the terms of the Building Code of the City of Hammond, Indiana, of which this becomes a part.

SECTION IV—LICENSE FEE

The license fee to engage in the business of refrigeration within the City of Hammond, Indiana, shall be Twenty-five ($25.00) dollars per annum, payable to the City Controller at the time of filing of application. License shall be renewed upon filing of proper application and payment of Twenty-five ($25.00) dollars annually thereafter.

SECTION V—REVOCATION OF LICENSE

Any holder of license to engage in the business of refrigeration as defined in this Ordinance found guilty of violating any part or section thereof through regular process of law may have his license suspended for a limit of time, entirely revoked and/or be fined and/or serve a jail sentence as prescribed in the

Hammond Building Code of which this shall be a part.

SECTION VI—DESIGNATION OF PLACE OF BUSINESS, AND VEHICLES

Each application for a license to engage in the business of refrigeration shall show street and street number of established place where applicant expects to carry on such business. Applicant shall upon receipt of his license, receive a license number which number along with established and recorded name of firm, corporation or person shall be displayed at such place of business and on all trucks or vehicles used by him, his or their employees in carrying on such work or activities covered by this ordinance. Any person, firm or corporation not having obtained said license and posted said bond within thirty (30) days of date of passage of this ordinance shall if found guilty in due process of law of violating any of provisions of this ordinance be fined in an amount as provided for in the Building Code of Hammond, Indiana.

SECTION VII—THE EXAMINING AND SUPERVISING BOARD

That there is hereby created a board for the examination of refrigeration mechanics within the City limits of the City of Hammond to be known as the Examing and Supervising Board of Refrigeration Mechanics. Said Board shall consist of five members, consisting of the City Engineer, two members of the Common Council, all of whose terms of service shall continue through their terms of office, one refrigeration contractor and one refrigeration journeyman, each of which shall have had at least five years experience in his respective field. These latter two shall be appointed by the Mayor and approved by the Common Council within five (5) days after this ordinance takes effect, and their service on said Board shall continue for a period of four years. If any vacancies shall occur on said Board, such vacancies shall be filled by the Mayor and City Council for the unexpired term. Members of the said Board shall meet within ten (10) days after the enactment of this Ordinance to elect a President and Secretary whose duties shall be to keep records of all applications, examinations, certificate issuances, renewals and other activities of the Board, and of all fees received and to pay them into the City Treasurer as soon as is practical after receipt of same. The Examination fee shall be Fifteen ($15.00) Dollars and said fee shall be paid to examining board. Said Board shall set up suitable examinations for Master and Journeyman Mechanics Certificate of Competency, shall receive applications, interview applicants and recommend applicants for Inspector of Refrigeration Equipment and Systems for appointment by Mayor and Common Council approval.

The Board shall be and is empowered to revoke the Certificate of Competency of any master or journeymen refrigeration mechanic or any Certificate of Refrigeration of any apprentice for cause. The Board shall be and is hereby empowered to adopt suitable regulations and set procedure providing for a public hearing upon presentation of written complaints, appeals or petitions from mechanics or the public. The Board shall receive petitions for investigation and recommend to Mayor and Common Council any additions or changes in this ordinance that may from time to time be necessary to keep same up to date.

SECTION VIII—THE REFRIGERATION INSPECTOR

That there is hereby created the office of City Refrigeration Inspector which Inspector shall be appointed by the Mayor and approved by the Common Council in a regular session of the Common Council. Applicants to the office of City Refrigeration Inspector must have no less than seven (7) years of active experience at refrigeration work as defined in this ordinance, not less than two (2) years of which experience shall be in the City of Hammond. Applicants to this office must file application with the Examining and Supervising Board of Refrigeration Mechanics which board shall subject applicants to such examination as they see fit and make the recommendation to the Mayor and Common Council. The Inspector shall sever any direct or indirect connections or financial interest in any refrigeration business within sixty (60) days after assuming his duties as Refrigeration Inspector.

SECTION IX—DUTIES OF REFRIGERATION INSPECTOR

The City Refrigeration Inspector shall have entire supervision over the inspection of all refrigeration work within the City of Hammond, Indiana. The Refrigeration Inspector shall, upon application of proper forms, grant permits for the installation of refrigeration systems devices and equipment, and upon payment of the required fees he or his assistants shall make inspections of all new refrigeration installations and make re-inspections of any existing refrigeration installations at such time as he may deem necessary for the purpose of safeguarding life and property within the City of Hammond, Indiana.

SECTION X—AUTHORITY

The Refrigeration Inspector shall have the right to enter any building during reasonable hours in the discharge of his official duties for the purpose of making any inspection or test any refrigeration work, devices or equipment therein and where such installations are found dangerous to life or property or not in conformity with existing ordinances, he is hereby empowered to disconnect or shut off and seal such equipment or devices after having given notice in writing to the parties concerned.

SECTION XI—TESTS

No refrigeration work shall be hidden from view in any manner, including pipe covering, flooring or enclosed in walls until the Refrigeration Inspector has inspected and passed on same. All piping on systems of more than 25 pounds of refrigerant charge by weight must be subjected to a pressure test using dry carbon dioxide or nitrogen under a pressure 100% above normal working pressure or not to exceed manufacturer's specifications. This test must be made on the piping with a suitable gauge mounted when

the Inspector is called for inspection. Large systems, using long and complicated runs of piping and tubing may be inspected in sections, however, the same pressure test as herein described shall be put to each part of the system as a whole. A final inspection shall be made when unit is operating before final approval is given.

SECTION XII—PERMITS FOR REFRIGERATION WORK REQUIRED

No refrigeration work as defined in this ordinance shall be done or cause to be done by any person, firm or corporation nor shall any person alter, move or change any system where alterations, changes or replacements are made of compressors, condensors, evaporators or refrigerant connections other than motors, controls or fixtures, without first having filed for in the manner hereinafter prescribed and obtained a permit from the Refrigeration Inspector and having paid the fee as hereinafter provided for. Work of any emergency nature may proceed up to the point where safety to life and property is no longer a factor; however, no work may be covered up or hidden from view until proper permits, inspection and approval has been granted by the Inspector. Permits to do any refrigeration work as defined in this ordinance shall be granted only to persons holding a Master Refrigeration Mechanics Certificate of Competency then in force. Such permit shall show license number of business causing work to be done, name and certificate number of Master Refrigeration Mechanic in charge of or doing the work, street name and number of place where work is to be performed, size of job in rated tons of refrigeration and cost of such permit. Such permit shall be kept at the location where the work is to be performed. Failure to present permit site of job on demand by the Refrigeration Inspector shall be a violation of this ordinance.

SECTION XIII—PERMIT FEES

All refrigeration work as herein described shall be subject to a permit fee as follows: Up to and including 1 ton capacity, $1.00; over 1 ton up to and including 5 tons capacity, 50c additional; over 5 tons up to and including 10 tons capacity, 25c additional; over 10 tons, 10c each additional. No permit fees or inspection is required for self contained units of less than ¼ ton or h.p. capacity. However, on request of owner, lessee, tenant . or Health officer such inspection shall be made for a $1.00 fee.

SECTION XIV—THE MASTER REFRIGERATION MECHANIC

Any person having served four (4) years as an Apprentice Refrigeration Mechanic plus three years as a Journeyman Refrigeration Mechanic in a manner as prescribed in this ordinance and having applied for the examination; passed same with a grade of no less than 75% correct, and having paid the $5.00 fee is entitled to hold a Master Refrigeration Mechanic's Certificate of Competency provided he pay the renewal fee of $5.00 annually.

Such Certificate of Competency shall entitle holder to present himself to the public as one certified by the City of Hammond to be skilled in the planning, superintending and the practical installation, servicing and repairing of refrigeration systems as defined in this ordinance, providing he has or his employing firm or corporation has paid the annual license fee and has furnished such bond as heretofore described. Such person, holder of a Master Refrigeration Mechanic's Certificate of Competency shall be responsible for all work for which permits have been granted bearing his certificate number. He may personally engage in refrigeration work and/or hire out to others to do such work.

SECTION XV—RELATION BETWEEN LICENSEE AND MASTER REFRIGERATION MECHANIC

Licensed and bonded persons, firms or corporations having in their employ or having as one member a holder of valid Master Refrigeration Mechanic's Certificate shall enter the name and holder of such certificate and his certificate number on all refrigeration work permits applied for. Where a holder of such certificate severs connection with party or parties licensed and bonded said holder of certificate shall not engage in business on his own until he has obtained proper license and posted the bond. Persons, firms or corporations shall not engage in refrigeration work without having in their employ or as one of their officers or members a holder of a Master Refrigeration Mechanic's Certificate of Competency.

SECTION XVI — PERSONS NOW ENGAGED IN REFRIGERATION WORK

Persons now actively engaged in refrigeration work and desiring to qualify for a Master Refrigeration Mechanic's Certificate of Competency shall within thirty (30) days of the date of the passage of this ordinance file application with the aforesaid City Examining and Supervising Board of Refrigeration Mechanic's stating thereon their qualifications and experiences. A majority affirmative vote of said Board on such application shall entitle applicant to Master Refrigeration Certificate of Competency provided the fee of $5.00 is paid with his application. After thirty days from date of passage of this ordinance all persons desiring to qualify for a Master Refrigeration Mechanic's Certificate of Competency shall be subject to examinations as heretofore provided.

SECTION XVII—JOURNEYMAN REFRIGERATION MECHANIC'S CERTIFICATE OF COMPETENCY

No person or persons shall hereafter engage in the occupation of or do any refrigeration work as defined in this ordinance as a Journeyman Refrigration Mechanic inside the city limits of the City of Hammond without first having secured a Journeyman Refrigeration Mechanic's Certificate from the Examining and Supervising Board of Refrigeration Mechanics. Exception: Qualified welders shall be allowed to weld the joints of refrigeration systems of ten ton capacity and larger when under the direct supervision of a Certified Refrigeration Mechanic.

SECTION XVIII—PERSONS NOW ENGAGED IN WORK AS JOURNEYMEN

Persons now actively engaged in refrigeration work and desiring to qualify for a Journeyman's Certificate of Competency shall within thirty (30) days of the date of the passage of this ordinance file application with the City Examining and Supervising Board of Refrigeration Mechanics stating thereon their qualifications and experiences. A majority affirmative vote of said Board on such application shall entitle applicant to a Journeymen Refrigeration Mechanic's Certificate of Competency provided the fee of $3.00 is paid with application. After (30) days of date of enactment of this ordinance, applicants shall be subjected to an examination in the practical and theoretical aspects of refrigeration, installation and servicing as defined in this ordinance. A grade of 75% or better shall entitle applicant to a Certificate of Competency.

SECTION XIX—IDENTIFICATION OF JOURNEYMEN

Journeymen Refrigeration Mechanics shall be issued a Certificate of Competency and a metal button or card bearing their license number which number must be displayed or carried on their person whenever and wherever any work as covered by this ordinance is performed.

SECTION XX—JOURNEYMEN REFRIGERATION MECHANICS

Journeymen Refrigeration Mechanics as defined therein, shall not contract, advertise or do any work on refrigeration equipment as defined in this ordinance unless in the employ of or under the supervision of a Bonded Licensed Master Refrigeration Mechanic. After thirty (30) days of date of acceptance no application for a Certificate of Competency as Journeymen Refrigeration Mechanic shall be accepted from applicants not having served four (4) years as an Apprentice Refrigeration Mechanic, or not having met the minimum school requirements as set up by the Examining and Supervising Board. Failure to renew said Certificate within thirty (30) days of date of expiration shall cancel Journeymen's Certificate of Competency and require Journeyman to pass another examination to qualify for another Certificate of Competency.

SECTION XXI—APPRENTICE REFRIGERATION MECHANIC

No person shall hereafter engage in the occupation of or work as an Apprentice on the construction, installation, alteration, repair or servicing of refrigeration systems or equipment as defined in this ordinance anywhere in the City of Hammond without having first secured from the Examining and Supervising Board of Refrigeration Mechanics a Certificate of Registration as an Apprentice Refrigeration Mechanic. At the expiration of four (4) years service on such work as the Board shall designate in addition to a minimum number of hours of instruction as outlined by the Board the Apprentice shall be eligible to apply for a Journeymen's Refrigeration Certificate of Competency. All Apprentices shall be registered in compliance of State and Federal Apprenticeship requirements. The Apprentice Refrigeration Mechanic shall work only under direct supervision of a certified Master Refrigeration Mechanic or a certified Journeymen Refrigeration Mechanic as set forth in this ordinance.

SECTION XXII — RATIO OF APPRENTICE

Each bonded and licensed firm or Master Refrigeration Mechanic may have one Registered Apprentice in their or his employ and one additional for every two licensed Master or Journeymen employed.

SECTION XXIII—HELPERS AND LABORERS

Helpers and laborers as defined in this ordinance shall not construct, install, alter, repair, or service any refrigeration system or equipment but under the supervision of a bonded Master or licensed Journeyman Refrigeration Mechanic may assist in placing equipment, cut holes in concrete, drive trucks or any other work not directly constructing, installing, altering, repairing, or servicing refrigeration systems or equipment. Any helper desiring to learn the trade shall apply as an Apprentice to the Board which Board shall evaluate his past experience in terms of Apprenticeship and if accepted by said Board shall abide by their directions as to his school and practical experience. In no case shall more than two years credit be given.

SECTION XXIV—SPECIAL CLAUSE FOR WAR VETERANS

All Veterans of World War II having been in the Armed Forces or any branch of the government Armed Forces and who were actively engaged at refrigeration work as defined in this ordinance prior to their joining or while in the Armed Forces shall not be subject to acquire their Certificate of Competency until a period of thirty (30) days after their release from the service. Such persons as above described shall file a record of their employment and activities relating to refrigeration work while in civilian life and while in the Armed Forces along with their application which experience shall total not less than four (4) years for a Journeymen's Certificate of Competency or seven (7) years experience for a Master Certificate of Competency. Applicants having less than four (4) years experience shall be given credit on their apprenticeship.

SECTION XXV

This ordinance shall be in full force and effect immediately after its passage and adoption, signed by the President of the Common Council, approved by the Mayor and its publication according to law.

TO SUPPLY the transportation needs in the frozen food field through all channels of distribution from producer to retailer, more than 2,000 new railroad cars and 10,000 new trucks and trailers are needed, according to frozen food economists. This mobile equipment should be refrigerated.

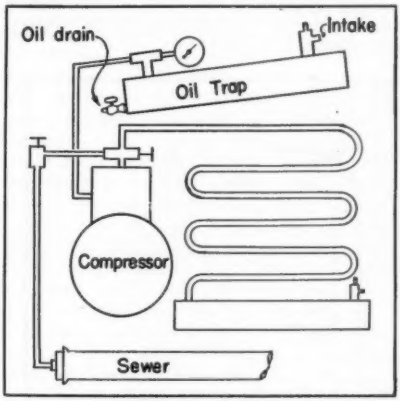
SERVICE POINTERS

A department for the exchange of ideas on new devices and methods of improving service work. Five dollars is paid for each pointer published. Write up your idea today and mail it to the Service Pointer Editor.

GAS DISPOSAL AND OIL SUMP UNIT

MANY shops have an old small-capacity compressor lying around with condenser and receiver tanks, that don't match and are of little use in any regular assembly, and not good enough for a customer's job. O.K.! Let's put them to work. The compressor is used for pump down.

Mount a shut-off valve on compressor at suction port and at discharge port. Use an old receiver and mount an intake "Shut-off" valve at one end, and toward the other end a "T" fitting. At this end of the receiver install a shut-off valve for oil drainage.



From the compressor suction shut-off valve run a piece of tubing to one leg of "T" fitting. At the other leg of "T" install vacuum gauge.

If this receiver is mounted in a tilted position, you have a vacuum tank and oil sump.

The purpose of this unit is primarily for exhausting or dumping gas from a household refrigerator. By hooking up high and low sides of your gauge test block to the corresponding outlets on compressor, and piping from the common outlet on the block to the intake shut-off valve on this vacuum tank, you can exhaust both sides of the system. Oil is retained at the sump end of the vacuum receiver tank. This avoids excess oil in your pump-down compressor and possible valve damages.

This oil can be used for many things, and because of the vacuum it will be odor free.

From the other post of compressor discharge valve, run a piece of tubing to the condenser. From the other compressor discharge valve port run a piece of tubing to a pipe that goes to and into the sewer. Water flushes the sewer when it is used.

We also use this unit for pumping a vacuum on repair jobs as a preliminary to charging the system. Hermetics can be handled with this unit hooked through the test block into the Hermetic fitting.

The unit will also give a fair test for leaks in system, by its ability to hold a vacuum. We pump down to 20" and 22" vacuum and run the repair job's compressor to evacuate air and lubricate the "seal." Then let stand, checking inches of vacuum once in a while.

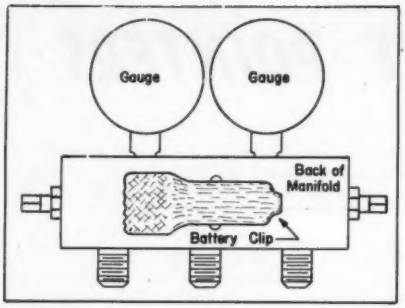
We find it very handy, and inasmuch as our shop is repair only, and is open to the public, no odors can offend the public, nor bother anyone.

We find that having a straight repair shop and placing it "up front," the natural curiosity of the public wanting to see what's going on, brings them in. Especially in these times, refrigerators on the floor attract them. *It is good advertising. Submitted by W. C. Hefferlin, Livingston, Mont.*

S S S

MANIFOLD CLIP

IF YOU have trouble holding your service gauge manifold in an easy-to-read upright position, here is a suggested way of overcoming the trouble. Solder or braze a large size battery clip to the back of the manifold, then use it to clip the manifold on to any convenient projection of the condensing unit or cabinet. The writer has used this



idea for several years and it works nicely. *—Submitted by George S. Gularte, Vallejo, Calif.*

daire Modulex Valves" which are especially susceptible to plugging. Various length "catch its" may be made as desired.—*Submitted by E. F. Cassing, Moberly, Mo.*

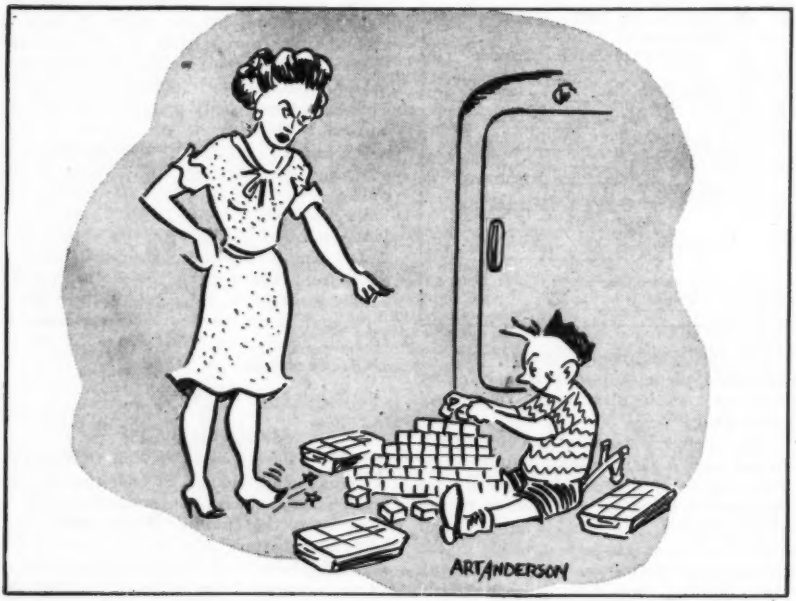
"CATCH IT"

A SIMPLE "catch it" may be made cheap, fast and easy by heating the ends of a six inch piece of ½" or ⅝" copper tubing, filled with steel wool, inserting a piece of ¼" tubing and pinching ends. Run a bead of silver solder around the pinched ends to stop leaks. These little items are just the thing for inserting ahead of those "Frigi-

CUTTING HERMETICS OPEN

CUTTING hermetics open has been done with hand grinders, lathes and even hack saws, but the best and most up-to-date method is with a cutting wheel. The hermetic dome must be held true in a lathe or some other such machine where it can be slowly rotated as the wheel is fed into the original weld. Wheels used are carborundum aloxite resenoid, ⅛ x 7" diameter.

SOME 200,000 restaurants and 10,000 hotels, all of them with mechanically refrigerated equipment, comprise the potential market for new equipment that will include facilities for storing food at zero temperatures, according to manufacturers.



"Junior, how many times have I told you those are not building blocks!"

Developing a Prospect File for the Commercial Dealer

By HERBERT HANLEY

THAT it is high time to begin thinking of the tough, competitive sales market ahead in selling refrigeration is readily evident. The "seller's market" is slowly disappearing, and customers once again are beginning to pick and choose. Therefore it is imperative that the up-to-the-minute sales organization should begin arming itself with every possible asset to make the most of salesmanship under aggressive competition.

One of the most important sales instruments to establish itself during the past ten years is the prospect file, which properly managed, shows the highest returns per call of any selling operation. Those stores which maintained a clean, timely prospect file went into the war better prepared to distribute merchandise and maintain goodwill. Now, they are likewise better set up to sell in the future market, with long lists of bonafide customers.

Why a prospect file? Any sales organization which gives much thought to development of new business for the firm recognizes the need for keeping some sort of record of people who are, or may become, interested in buying the merchandise they sell. The store must realize that to uncover the names of good prospects entails the expenditure of much time, energy and money. Now, when shortages of merchandise still exist, allowing plenty of time for the work, the company should allot plenty of time to working up a smoothly-operating prospect file system.

In general a properly operated prospect file first serves to organize field work so as to show the greatest amount of sales per call made by salesmen. In general, the cards should show:

1. The best time for calling.
2. The frequency of call backs.
3. The special interests of prospects.
4. Goods already purchased by the prospect.
5. Mailing dates for sales literature, letters, etc.
6. The source of the prospect. If he was recommended by a friend, the latter's name should be included.
7. Name, address, position and credit rating of the prospect, together with remarks on his buying habits.
8. Special information about the prospect's own business.
9. Periods at which the prospect should not be bothered.

The commercial refrigeration dealer can easily make up such a card, which is a brief summation of the prospect's own situation, and a summary of what he may be expected to buy, and when. Cards should be such that any salesman can use them to advantage, whether familiar with the prospect personally or not.

Methods of Developing a File

By far the most simple method of prospecting is "Chain Prospect Work." Under this system, the organization should spend a few extra moments in making inquiries on the subject of additional sales leads. Every customer knows other men in the same business who will sooner or later buy—and properly approached, they will usually furnish their names. When the second customer is sold, he likewise is a source of more leads. Tactful questioning will always bear fruit in this connection, and is invariably well worth the time expended. Remember also that the use of a friend's name in making sales calls is a potent means of getting off on the right foot. Information compiled in this way and transferred to file cards represents a valuable market highly receptive to the company.

Ways to Obtain Names for File

1. Listing every inquiry from advertising.
2. Names obtained through surveys and manufacturer reports.
3. Recommendations from friends, satisfied users and allied business firms.
4. Brief contacts in store traffic. Every

retail store employee should be kept alert to later possibilities and secure names and addresses of store customers.

5. Newspaper accounts of business changes, new offices, etc.
6. Names turned by servicemen repairing refrigeration, or making inspections of customer's equipment.

All of the above can become valuable prospects, once placed on a systematic follow up basis. Outside salesmen, store clerks, service mechanics, etc., can co-operatively produce leads for the prospect field. Every name added usually is a source of more leads. Constant reading of newspapers, research into the field, etc., will turn up the names of people who are logically in the market for various products.

Operation of a Prospect File

The following fundamentals govern operation of a prospect file for the routing and control of individual salesmen or an entire salesforce:

1. Prospects should be classified not only as to their interest in certain products and trade names, but also as to the degree of their interest in new developments in general.

2. They should be given constant attention. Many cards "die" in the file while awaiting handling. In all cases, the listed prospects should be followed up frequently, to demonstrate the firm's interest in the individual customer, and to catch sales opportunities when they occur. At each call, the salesman should use the card to refresh his mind as to the needs, position and buying habits of his prospect. A notation of every call should be added on the file card, to keep it up to date. Even the most inactive prospect should be contacted periodically, according to the salesman's estimate of possibilities. If nothing else, such calls keep the firm name in the prospect's mind.

3. "Up" System. One of the most practical methods of keeping a prospect file paying results is to schedule the cards so that each comes up for attention on a certain date. Under this plan, no card is overlooked or ignored, and the prospect has no chance to forget that a salesman will be around to see him.

4. Where the file is too large for individual personal calls at all times, use of the telephone often suffices to keep interest alive; and to make sales if the moment is ripe.

It requires only a few months to build up a file actually covering most of the potential market. The wise sales organization will spend the slack time available now in setting up a system which fits its peculiar needs—embracing new markets, covering the replacement field where customers have been sold before, and sufficiently flexible to permit the constant addition of new prospects.

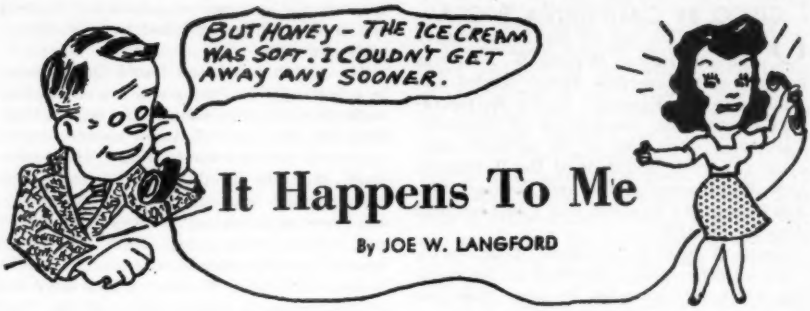
* * *

A Trip With a Btu.

IN THE course of teaching refrigeration to returned veterans under the G.I. Bill and Rehabilitation Program, an occasional amusing answer is received on tests. One of these was received recently, in an eastern school. Here it is:

Refrigeration instructor—"Take one British thermal unit on a return trip—from the air surrounding a refrigerated box, into the box and out again."

Answer on test paper—"Because Mrs. Jones had a bridge party and is late in preparing supper, she puts the hot pudding she had perpared into the refrigerator so that it will jell quicker. Sitting on top of one of these glasses of pudding is Johnny Btu. After a short time, Johnny Btu. finds himself being drawn toward the evaporator (cooling coil to you) and soon passes through the metal wall of the evaporator and into some very cold liquid called F-12. As he swims to the surface he notices that the liquid is boiling around him. As he surfaces, he hops on a bubble that is rising out of the liquid and is being drawn toward a loud noise, through a long tunnel. While going through this tunnel his bubble breaks and he falls to the floor and finds himself sliding along in some oil. He soon finds himself deposited in a large pool of this oil with large wheels and rods churning above him. So—not to be one to miss anything, he hops out of the oil and is drawn through this maze of machinery and suddenly finds himself crushed into a small space with millions of other Btu's. whereas before he only noticed hundreds. Johnny and his friends are pushed along through another tunnel that winds and turns. He notices that many of his friends are disappearing and it is getting colder. Again he finds himself passing through a metal wall and is blown around by a strong wind, down to the floor. As he walks out from under the refrigerator he sees Mrs. Jones and her husband eating the pudding that he was sitting on a short time ago. He wonders whether he is better off or not."



It Happens To Me

By JOE W. LANGFORD

THE old supposition that a serviceman has nothing to worry about but just install a new "Something" and ride around, is as far wrong as it would be to say "Sulphur doesn't smell."

About four o'clock last Saturday afternoon we have the rush call hook slick as a slate, and we feel certain everything will come out on time for once. I have nothing more planned for the evening but a heavy date with a cute registered nurse to go out dancing, and rather early. "Wait hold everything, here comes a call at 4:05, the ice cream is melting."

Motor hums—but not musically

Grabbing my toolkit, and a 3320 belt to play safe, I take off and arrive at the scene shortly to find the motor stuck! After pulling the slide-out unit out on the floor the conduit near by gives a couple of "Whops" and out goes a fuse. I disconnect the cabinet, replace the fuse and start running over the portable cord insulation for shorts; this is, of course, after freeing the motor and checking the terminals carefully. The wiring looks pretty good except where the switch lead is anchored about an inch and a half from the fan blade. The thermostat is off for sure, besides the cord is still pulled, or is it!? No, I guess it wasn't because the motor starts up with the fan taking a nick out of my finger. It sums up that the cashier thought the unplugged cord was to her cash register which wouldn't operate until she plugged it into the outlet; and of course, the thermostat lead was short circuited at the clip. Now to find out what caused the fuse to blow after pulling the unit out. It isn't long until I have a completely new wiring harness throughout, and the unit is operating nicely. I slide the whole thing back into the cabinet and flip the switch, the motor just sits there and hums like the starting winding or circuit is open. I then pull the unit back out in the floor and the motor works good, no dragging rotor, bad starting points, nor stuck motor. With the unit back in the cabinet, the overload cuts out because of the starting points again.

This leaves only one thing to do, and in a hurry too for the time is close to 5 P.M. It would be that our service exchange motors of this type are not in stock. Well, now let's see, it wouldn't take too long to clean up this motor and put in a new starting point "Skillet," in short order at that. Three little mice fall out the bell housing, not only blind but well pickled in oil and dust. After cleaning out the dirt and grease with carbontet, the points look good so I speed-up the assembling process to nothing flat.

Now that the worst of it all is over with, at least the part that seems to take up a man's time when he is in a hurry, I go out to get the cradle base and pulley.

At 6:30 the cabinet is pulling frost right on down the suction line, but by the time I get cleaned up and make a telephone call, "Brother, I am stood-up, and for good too except during the middle of the week when she has nothing else to do."

Now, will someone please convince me which calls for the most tolerance: women or a contrary piece of refrigeration equipment.

* * *

THE potential market for home and farm freezers and frozen food storage cabinets has been estimated by manufacturers at 1,000,000 units and the potential market for new domestic household refrigerators has been figured at 17,500,000 units by the Department of Commerce. Most new home refrigerators have frozen food compartments of one or more cubic feet.

FARR WELCOMED AT SAN FRANCISCO BY CALIFORNIA R C A

ON THE last lap of his cross-country tour and survey, Warren W. Farr was honored at an overflow dinner tended him June 16 in San Francisco by the Refrigeration Contractors Association of Northern California. President of the national association, Farr is president of the Refrigeration Maintenance Corp. and Refrigeration Sales Corp. of Cleveland, and a past national director of RSES.

James A. Scatena, president of the Northern California group, presided at the meeting which was attended by more than one hundred members and their ladies. Toastmaster was Nat Silverstone, president of Silver-Stahl, Oakland, while the honor guest was presented by Lee Shirar, president of Shirar-Young, San Francisco, and a national director of NARC.

Prior to the dinner, Farr met with the full board of directors and discussed with them their projects and accomplishments. He summed up his reaction by grading the Northern California group as "the outstanding association in the country." He congratulated Zed E. Jones, secretary-manager, on his untiring efforts on behalf of the association and the industry in general.

Farr urged the group to better their labor relations by making the union business agents "your personnel managers." By discussing the problems of the industry well in advance of contract negotiations, he said, the unions will be reluctant to make impossible demands.

He asserted that he found the industry in a generally healthy condition on his tour with the most distressing factor being a tendency on the part of some contractors to overstock hitherto scarce items. He emphasized that the production bottleneck was being broken and shortages overcome. If too heavy an inventory is carried, he pointed out, widescale dumping might follow and upset the price structure.

Farr stated that his survey convinced him of the enormous buying power of the West and he predicted that a regional all-industry trade show would become a regular affair in that area.

Visits Los Angeles Group

Mr. Farr also spoke at the Rodger Young Auditorium in Los Angeles on the evening of June 11 to a large gathering of refrigeration contractors and others affiliated with the industry. The meeting was jointly sponsored by the Refrigeration Contractors Association of Los Angeles and the Commercial Refrigeration Association of San Diego, both of whom are affiliated with NARC.

Mr. Farr announced that the NARC is seriously considering setting up a testing procedure for refrigeration apparatus and

Directors' Meeting, Refrigeration Contractors Association of Northern California, held at the Whitcomb Hotel, San Francisco, June 16. Standing, left to right: R. Y. Beasley, Director, Stanislaus-Merced Counties Unit, Turlock; Ed Tanner, Director, San Francisco; R. H. Hartman, Director, Santa Clara Valley Unit, San Jose; George W. Turner, Director, San Joaquin County Unit, Stockton; R. Quigly Watt, Director, San Francisco; A. K. Turner, Past President, Oakland; A. M. MacLennan, Director, Sacramento Valley, Sacramento; E. L. Sattler, Director, Concord; Lee Shirar, National Director, San Francisco. Seated, left to right: Z. E. Jones, Secretary-Manager, San Francisco; Warren W. Farr, National President, Cleveland, Ohio; J. A. Scatena, President, San Francisco; Al Robinson, Vice President, Oakland; Nat Silverstone, Treasurer, Oakland; L. E. Kreps, Recording Secretary, Oakland.

parts. The actual testing would be done by qualified laboratories in several universities or similar institutions. The need of such a testing procedure has been demonstrated many times in the past, and a pilot run of one type of material has already been made. The results of this indicate clearly the need for such an unbiased service.

Mr. Farr was introduced by R. W. Noll, president of the Los Angeles Refrigeration Contractors Association and was welcomed by Robert Parker, president of the San Diego Commercial Refrigeration Association. In addition, W. W. (Bill) Allison of Los Angeles, International president of RSES greeted Mr. Farr on behalf of his group.

Other guests at the meeting were R. H. Beck, a former director of the Los Angeles association and for many years Pacific Regional Manager for the York Corporation, now retired, T. H. Chamberlin, a former president of the Los Angeles association, now operating a refrigeration wholesale business, and Z. E. Jones, Secretary Manager of the Refrigeration Contractors Association of Northern California in San Francisco.

Visitors from points outside of Southern California who were in attendance were E. J. Houser of the Karlson Machine Works, Phoenix, Arizona, A. M. Fenwick of E. R. Benedict Co., Cleveland, Ohio, Charles E. Harris of the Harris Refrigeration Co., Boston, Mass., H. D. Andress of the Associated Engineering Co., Cleveland, Ohio, Ed Kellie of the American Injector Co., Detroit, Michigan, and F. P. Neff of Tupman-Thurlow, Chicago, Illinois.

Seattle Meeting

The first state-wide meeting of refrigeration contractors in the State of Washington was held in Seattle at the Mayflower Hotel, June 14, by the Refrigeration Contractors Association of Washington, Inc.

The occasion was the visit of Warren W. Farr, president of the National Association of Refrigeration Contractors, who spoke on "Putting More Dollars in Your Pocket by Working Together, Locally and Nationally." Mr. Farr outlined the various things that a local association could do to make its services valuable; pointed out the things that a national association could best do; and emphasized the importance of a strong tie-in between the national and local associations.

Also on the day's program was an address on "In Business for Profits," by Paul B. Reed, Manager, Refrigeration Controls Division, Perfex Corp., Milwaukee; and one on "Air Conditioning," by Roy O. Smith, formerly Chief Engineer, Alaska Division, United States Engineers.

The program included a film on "How to Make a Sales Presentation Stay Presented," and a visit to the Refrigeration Engineering Co. and Automatic Refrigeration Co. in Seattle.

A buffet luncheon was served at noon; and the day's activities climaxed by a cocktail party and dinner-dance at the New Washington Hotel, with 170 members and guests present.

On the day preceding the meeting, the Board of Directors met with Mr. Farr to discuss local and national policy matters. State plans for the year ahead were outlined and committees appointed on fair trade practices, codes and licenses, labor, apprenticeship, education, programs, meeting attendance, and Contractor-Jobber relations.

The state association operates through five regional groups, each of which holds a regular meeting each month. While only organized last January, already the membership is 70 contractors.

A general view of the dinner dance held June 14 by the contractors in Seattle, Washington, during the first state-wide meeting. Warren Farr, N.A.R.C. president, was the guest of honor.

A Serviceman Named Harry

By E. F. CASSING
Moberly, Mo.

SERVICE calls are usually service calls and that's about all there is to it but when Casey, practical and service hardened, takes Harry along you really have something!

Let me explain who Harry might be. He might be a college graduate who has had a great deal of technical training and 4 or 5 years of practical experience; or, he might be a fellow well versed in general refrigeration practice. He might even be a hard working young chap, fresh from refrigeration school, with a real tendency and knack for refrigeration work . . . but he isn't!! Harry is just another of that type of person to whom a monkey wrench seems to be too heavy to carry. A screwdriver always seems to be in the way except to use to scrape the grease from under the fingernails. A pair of pliers is good for nothing except to pull a cork from a bottle. I'm sure you get a general idea of Harry. And oh, yes, the service manager wants to see Harry tonight at 5 sharp!

We could of course start this day's run with a story about the familiar service call of once upon a time there was a soda fountain. Unfortunately this story is not about anything so big as a soda fountain. In fact, it's so small that it's really not a story at all, except for Harry, who wants some real practical experience on equipment. This is a service call on a two-hole Frigidaire ice cream cabinet that uses Freon-12 refrigerant, low side float, brine, twin cylinder compressor, air cooled and thermostatically controlled.

You wonder how a neat packaged job such as this could cause undue trouble? You wouldn't be thinking that maybe Harry made a service call on it previously? No, not Harry! Oh, no? Harry made, to be specific, 4 service calls in two days and still the cabinet would not hold ice cream. We could well state this problem algebraically by stating that the temperature of the restaurant owner was equal to the temperature of the cabinet.

Luckily the job was near town so we didn't lose too much time driving. After hearing Harry's story of all the trouble he had on previous calls I can't say that I blame the customer for getting disgusted. Harry had pulled the float twice for no reason at all other than to check the float calibration . . . as if Harry knew how to calibrate a float. Twice he had blown oil over the floor and caused a great deal of commotion such as one waitress falling on the oil, a second waitress slipping and spilling a dinner over the floor. One young lady stumbled over the motor and literally tore a perfectly good pair of nylons.

We arrived on the job at a convenient time. The breakfast rush was over. While I installed gauges on the compressor I decided once again to quiz Harry so that I wouldn't miss anything he had done. "When you came out the other day, Harry, was the ice cream very mushy?" I said.

Harry answered quickly, "Oh, no, it was a bit soft but I figured it just wasn't set cold enough."

"So you set it colder," I cut in.

"Yes, I did, Casey, but I was going to ask you about it when I discovered it seemed to be running a lot."

The owner had told me earlier that the unit had been running all the time but that he didn't object to it running as long as it kept the ice cream hard. The head pressure ran about 150 lbs. and the suction pressure was 15 lbs. Since it had been under an unusual strain I didn't think too much about it. I stuck my screwdriver ear against the float and listened, but finding no hiss I came to the conclusion that it had sufficient gas.

Quizzing Harry again I found that on his second call to the job he had found the pulley slipping and had tightened it. That, of course, was after he had pulled the float and installed a new one, "just to be on the safe side," as Harry put it.

So far, to me, on our preliminary checks everything seemed to be in order. The condenser was a bit dirty—you know that special type of restaurant greasy gummy dirt. I asked Harry why he hadn't cleaned it on the first call. He told me he "had planned on doing it after the job was running good but first wanted to have refrigeration."

I didn't bother to answer him on that count, I just cleaned the condenser. Almost instantly the head pressure dropped 15 lbs. I thought to myself no wonder the pulley slipped, but I said nothing.

Knowing Harry and his rough speedy type of work I assumed in all probability that he had gotten moisture in the system and wondered how long it would be before it showed up. It wasn't long either. I had hardly returned from the service truck after getting a dryer to install when "Ca-plunk" down went the suction gauge to a neat 25" vacuum.

"Hey, Casey, look at that, just like it did the other day," said Harry.

"You mean after you saw that the other day you had no idea what was wrong?" I asked.

"Well, Casey, I thought the float was stuck so I changed it," Harry replied.

"Did you throw a torch against the float header to check for moisture, Harry?"

"Moisture," said Harry, "well, I'll tell you —I forgot how to check for that on a float job so I exchanged floats—to be on the safe side."

I grabbed the torch and applied a bit of heat to the header and soon the gauge pressure increased to normal again. Even though I had run out of patience, to see the job work normal I felt mighty good inside.

To make a long story short, a dryer was installed in the liquid line. The job was reassembled, the owner was informed of our activity and we packed up our kit.

On the way back to the shop I told Harry I felt sure that the original trouble was a stuck float or moisture, which, I didn't know, but if he would make a practice of spending a few extra minutes studying each call on the job before he opened his tool kit, the trouble would be more easily reached.

What happened to Harry? Well, the last I heard of him he was putting in time down at the corner soda fountain wearing a white apron. I always knew he had a place in life!

REVERSE CYCLE WATER HEATING

HOTPOINT has developed a water heater that draws its heat from the surrounding air by means of a heat pump. While an efficiency coefficient of 3 to 1 has been obtained in the laboratory, experiments with home installations have not, as yet, been conducted. According to J. C. Sharp, vice-president of engineering for Hotpoint, "no move to manufacture the machine in the predictable future will be made, but exhaustive studies, in collaboration with utility company engineers will continue." These studies will be in the form of about 100 pilot installations where tank sizes necessary for various domestic hot water needs and motor requirements to power these units will be studied. Utility engineers will analyze these test installations with a view toward determining the relative value of 24-hour-a-day operation of the heat pump water heater as compared to the off-peak operation of the resistance type water heaters that are often equipped with an automatic time switch to prevent operation during certain hours.

Principle of Operation

Following the basic engineering principle of the electric refrigerator, Hotpoint's experimental water heater reverses the utilization of transferred heat. An exposed evaporator unit is installed in the basement or utility room. With maximum exposure to room atmosphere, the Freon gas contained in the evaporator unit is allowed to assume room temperature, usually 65 or 70 degrees, and is compressed by means of an electrically driven pump. Upon compression the temperature of the Freon rises rapidly because the original amount of heat is now confined to a much smaller area. Tubular coils then conduct the hot Freon from the pump into an insulated 80-gallon water tank where it condenses and releases the heat.

Surface temperature of the evaporator is always many degrees cooler than the room in which it is located and if the appliance is developed to its logical conclusion it may some day be developed to utlize the return cycle for air conditioning and de-humidifying the home. However, present studies are concentrated on the water heating phase alone, Sharp said.

Expected advantages of the heat pump water heater are greater economy of operation and more uniform daily operation. In the laboratory 2.9 kilowatt hours of heat have been returned per kilowatt hour of motor energy used and the goal of continuing studies is to reach an efficiency ratio of

No. 410-DS 5
No. 410-DF 4

Now... Moisture and Dirt Come out Fast in Your Larger Systems*, too!

Install new Large Capacity, Rechargeable

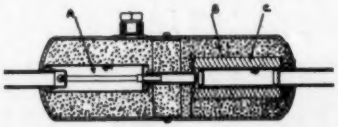
TRAP-DRI Drier • Filter • Strainer

• To you men who know how valuable the A-P TRAP-DRI can be on smaller systems up to 1 ton capacity — this announcement of a new larger-capacity TRAP-DRI will be welcome good news! It means you can give the "break" to both the larger systems, and those smaller systems which need a larger capacity drier for preliminary cleanout . . . Provide all these systems with the *extra protection* that means so much to improved system efficiency, avoidance of common troubles and service difficulties due to dirt, solder particles, scale, sludge and moisture.

• The new larger A-P TRAP-DRI starts cleaning up your system immediately, trapping all impurities and moisture that too often cause trouble. Offering *minimum pressure drop*, it provides a filter unit as effective as a 900 mesh strainer (removing materials as small as 5 microns in size) . . . *plus* a highly-efficient and adequate charge of Silica Gel.

Drying agent may be removed and replaced, or dried out and re-used.

• Installed on your larger refrigeration systems, this new larger capacity TRAP-DRI means improved operation, savings in service time, greater satisfaction and cost-savings for your customers. You'll find them at leading refrigeration parts jobbers — or write for latest bulletin.



Cross section of new 3-ton A-P TRAP-DRI showing: (A) Screen at inlet diffuses refrigerant into Silica Gel; (B) Silica Gel drying agent; (C) Honey comb filter element traps impurities as small as 5 microns, by depth filteration principle.

VERSATILITY IN INSTALLATION — The new TRAP-DRI is supplied either with ½" male flare (DF-4), or ⅜" sweat connection (DS-5). May be easily connected to ⅜", ½", ⅝", ¾" and even ⅞" tubing if desired. This ready versatility makes the TRAP-DRI adaptable to a wide variety of systems.

*Model 410 carries 53.7 cubic inches of Silica Gel. Nominal rating, 3 tons Freon

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DEPENDABLE *Refrigerant Valves*

STOCKED AND SOLD BY GOOD REFRIGERATION JOBBERS EVERYWHERE . . . RECOMMENDED AND INSTALLED BY LEADING REFRIGERATION SERVICE ENGINEERS

4 or 4.5 kilowatt heat hours for each kilowatt hour of motor energy. This would make the dollar cost for energy sufficiently lower to compensate for the cost of machinery. Utility interest in development of the heat pump water heater is centered around the fact that it will aid in levelling off load peaks by spreading consumption over a 24 hour a day period.

REFRIGERATION SOLVES A MARKET HOT WEATHER PROBLEM

REFRIGERATION has solved the hot weather problem in Tujunga, California, food markets!

Plagued with spoiled merchandise in this small Southern California city where the mercury hovers around the 110 mark during the summer months, Bob Rankin, owner and manager of Rankin's Super Market, has turned to the electrical refrigeration industry for aid.

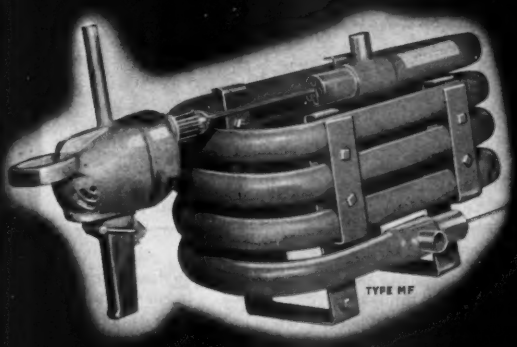
Rankin has completely equipped his market with Tyler refrigeration cases, installed by Perfecold Refrigeration Company of Los Angeles. One of the most outstanding features of the market is the meat department, where 38 feet of Tyler display boxes attractively merchandise meat and dairy products.

In the bakery department, Rankin has converted a Tyler Dairy case to keep pies, cakes and candies from spoiling in the warm weather. Customers comment on the attractiveness of the display and the high quality of the merchandise.

The most popular department in Rankin's Market is the liquor counter which specializes in cold beer for thirsty palates on warm days. A long Tyler dry beverage cooler keeps 30 cases of beer ice cold for tired customers. A Perfecold reach-in case with glass doors, is used exclusively for quart bottles of beer for home use.

By utilizing the latest refrigeration models, Rankin has made his large independent store one of the most beautiful markets in the Southern California area.

A clerk at Rankin's Super Market in Tujunga, California, is shown at a Perfecold 347-G model, reach-in refrigeration case.



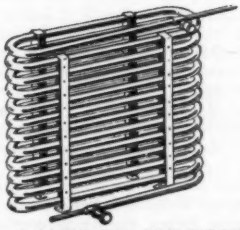
STANDARD

CLEANABLE—Continuous sweeping return bends permit easy cleaning. Simply disconnect the water inlet of the Multi-flow condenser. Then use a plumber's auger turned by hand or electric drill.

SIMPLE—Water flows through a cluster of ½" copper tubes in the Multi-flow condenser. Mounting brackets are designed for easy installation.

ECONOMICAL—High heat transfer capacity with a minimum water flow. Low resistance is offered to both the water and refrigerant.

NOW AVAILABLE IN SIZES RANGING FROM 1½ TO 25 H.P.



TYPE C SERIES

Standard's well known all copper counterflow condenser meets the requirements for high capacity on ½ to 3 H.P. units. Compact, light, and fabricated on short radius bends for convenience in mounting and replacement.

WRITE OR ASK YOUR WHOLESALER FOR COMPLETE SPECIFICATIONS

QUESTIONS and ANSWERS

On Problems of Servicing and Installation of Refrigerating Equipment—Send Your Problems to the Question Box.

NORGE FLOAT DEFECTIVE

QUESTION 799: I read of a Norge Rollator problem in a recent issue of THE REFRIGERATION SERVICE ENGINEER, so now I write about a Norge Rollator also.

To begin with, it is a Model KP. The original complaint was a continuously running unit. Investigation revealed a bad centrifugal switch, which had soldered itself closed from heat. We changed the switch on the motor, replaced it, started the unit and immediately the Rollator began a dull clatter. Through lack of experience in the field as of yet, we decided the Rollator had thrown all the oil into the low side float during its continuous on cycle. Heat, tilting of the evaporator, and other methods failed to alleviate the condition. The clatter remained. We then decided to change the needle in the float and at the same time try to determine whether or not the float had become stuck open. At the same time we changed the suction valve because of an idea that residue had clogged the screen. We certainly tried all we knew or heard of. The idea that the float had stuck open came from a back pressure of 45 to 60 pounds, and a high side of only 30 pounds, which would not change during a recharge.

Next we changed the Rollator for a replacement and it didn't help. After nearly ruining the replacement we had that one changed and it doesn't make an iota of difference. The clatter remains and we are unable to attain a condition which will permit operation of the unit. We are still of the opinion that the float is stuck open but because of the fact that our operation facilities are small, we hesitate doing this removal operation and so we wish to have your advice before going ahead with its removal. When we first went to look at the unit before doing any repairs even to the motor, the customer said it had run all one evening until the motor began to smoke and the entire unit smelled like it was scorching the wooden parts of the box around it.

If we ever work on another like it, a new plan of attack or an answer to this problem would be tremendously appreciated. I hope I have stated enough of the facts on this unit to give you information to work on for a possible answer to it.

ANSWER: The Model KP Norge refrigerator was built in about 1933. It is charged with 5½ pounds of SO_2 and 30 ounces of oil.

I think that your diagnosis is correct in so far as it goes when you say you think the trouble is in the float, but to go a little farther, I am inclined to think that you will find the trouble is due to a broken spring which is used as a buffer on the float arm. Occasionally these springs will rust out and when this happens it disconnects the float bulb arm from the arm that controls the float needle and the needle arm is permitted to drop, leaving the port to the float wide open.

I would suggest that you refer to our new book entitled "Service Pointers," page 128, which shows a cut-away view of this float and explains what one serviceman found it necessary to do in order to make repairs. If you do not have a copy of this book it is available through this office at $1.50.

WHAT CLEARANCE FOR PISTONS?

QUESTION 800: Will you please tell me what the clearance is between the piston and cylinder on a 1/6 hp. (new) compressor without piston rings and the compressor with piston rings? Does excessive clearance cause oil pumping like in automobiles?

What causes the high side float on a 1934 Kelvinator, which is mounted on the condensing plate right next to the condenser, to have a rattling noise that sounds as though the float is hitting the sides? When I put my hand on it, it stops or deadens the noise. Should it be replaced or should I leave it alone? It is still freezing. I have tried everything to deaden this noise but without success. On some boxes I have mounted the float beside the condensing plate so it won't vibrate, and have had good results. The same noise is just as noticeable when the Imperial high side float is mounted on the condensing plate.

I have also had several customers inquiring about changing their sulphur boxes to "Freon-12." These boxes are reciprocating compressors. Would appreciate your advice and information on this matter.

ANSWER: I don't know what the exact clearance between piston and cylinder, used

Casting . . . ?

There's no need to cast around for the solution to your refrigeration parts and supplies problem. Kelvinator has the answer!

For your convenience, there's one of Kelvinator's 50 depots near you carrying a *complete* inventory of *quality* refrigeration parts and supplies.

Whatever you need, you can find it in stock . . . *competitively priced.* And you can count on quick service, too, whether you stop in, phone or mail in your order.

DIVISION OF NASH-KELVINATOR CORPORATION, DETROIT, MICH.

Kelvinator

CONDENSING UNITS
REFRIGERATION PARTS AND SUPPLIES

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by the manufacturers on a 1/6 hp unit, is at the present time. However, a compressor that has been in use for some time will probably have a little more clearance than it originally started with. Some years ago we used to figure that pistons should have a .001" clearance per inch of diameter. This is more clearance than the manufacturers use at the present time, but it acts as a fairly good guide in checking up on your pistons. If it does not exceed this amount, the piston is still satisfactory.

Excessive clearance in pistons would not cause oil pumping as it does in automobiles. Oil pumping is more often caused by refrigerant condensing in the crankcase of the compressor during the off cycle which causes foaming of the oil during the on cycle due to the refrigerant boiling in the crankcase. The refrigerant being drawn out of the crankcase will carry with it some of the oil. Condensing of the refrigerant in the crankcase during the off cycle is very often caused by the compressor being in a cold location.

The cause of the high side float rattling is probably due to the float striking the side of the container. However, it will not do the float any harm in most cases, and the float will continue to function as it should. The noise, of course, is annoying, but I cannot suggest any method other than what you have tried to deaden this noise.

I see no point in changing a sulphur dioxide system to "Freon-12." Such a change would involve other mechanical changes in the system and might be quite costly. There is nothing to be gained from the change which would in any way benefit the customer in satisfaction received from the performance of refrigerator.

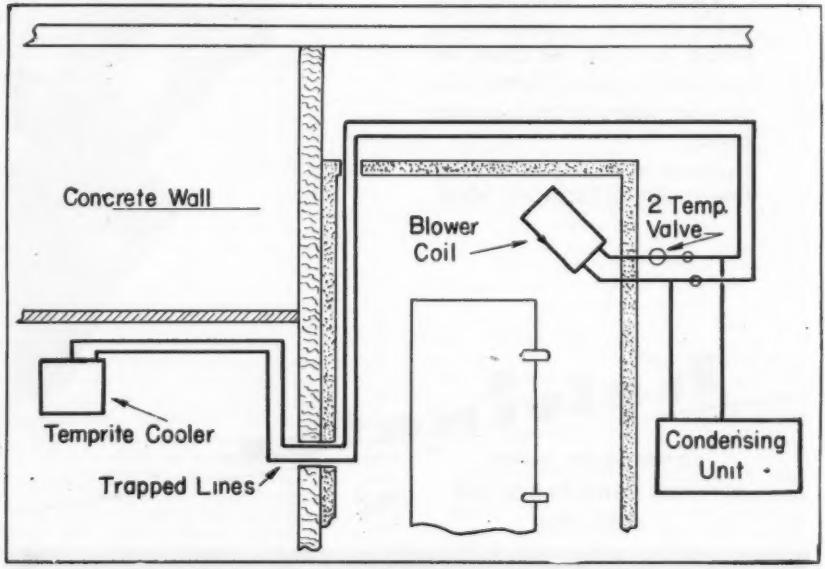
COOLER AND TEMPRITE SYSTEM

QUESTION 801: I have a refrigeration problem that has been giving me a headache ever since I installed it about six months ago. Following is the setup:

It is a 10'x10'x6' cooling room; 4" cork and a 26-B3-W2 Temprite cooler. The cooler room temperature is 45 degrees. The beer taps are on the same level as the cooler room. Both units are operated by a 2 hp. air-cooled Copeland unit. I have a two-temperature valve on the tail end of the cooler room suction line.

Now my trouble is that when the unit shuts off the pressure builds up too quick. I tried two new valve plates which made no difference. I disconnected the oil trap return oil line and it still built up too quick. Another trouble is that it will run all right for several hours then the overload on the starter box pops out. If I cut either the cooler room or

(Continued on page 86)



Layout of system indicates bad trap in the suction line.

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NEWS and ACTIVITIES

Announcements of the activities and educational work of the International Society and Local Chapters appear in this department.

COMING CONVENTIONS

Alabama Association
Place: Admiral Semmes Hotel
City: Mobile, Alabama
Date: October 17, 18
Chairman: T. O. Cooper, Harris Supply Co., Mobile, Ala.

National Locker Convention
Place: Municipal Auditorium
City: Kansas City, Mo.
Date: September 25, 26
Director: R. R. Farquar, 656 Insurance Bldg., Omaha, Neb.

Illinois State Meeting
Place: Baker Hotel
City: St. Charles, Ill.
Date: November 1, 2
Secretary: R. E. Saunders, 730 Towanda Ave., Bloomington, Ill.

New England States Association
Place: Bond Hotel
City: Hartford, Conn.
Date: November 9
Secretary: Lee J. Wallace, 29 Cave Street., New Haven, Conn.

RSES Annual Convention
Place: Hollenden Hotel
City: Cleveland, Ohio
Date: Jan. 21, 22, 23, 24, 1948
Secretary: H. T. McDermott, 433 N. Waller Ave., Chicago 44, Ill.

R.E.M.A.—All-Industry Exposition
Place: Cleveland Public Auditorium
City: Cleveland, Ohio
Date: January 26-29, incl., 1948
Secretary: R. Kennedy Hanson, 1107 Clark Bldg., Pittsburgh, Pennsylvania

Interprovincial Association
Place: King Edward Hotel
City: Toronto, Ont.
Date: March, 1948. Dates to be announced later.
Secretary: E. G. McCracken, 215 Laird Drive, Leaside, Ontario.

WINNIPEG RECEIVES CHARTER

THE presentation of a charter by the Interprovincial Association to the recently formed Winnipeg Chapter took place at the St. Charles Hotel, Winnipeg, June 18th. G. O. Roe of Montreal, President of the Interprovincial Association, made the formal presentation in the Society's behalf. The chapter has an enrollment of over eighty, the majority active. This number, in consideration of the fact that the chapter is removed from the main manufacturing centers which supply the refrigeration industry, represents one of the largest groups in Canada—a tribute to the endeavors of the officers and members of the chapter.

Besides the older refrigeration men in the chapter who form the backbone, a large group of young veterans of World War II who trained for the trade in rehabilitation courses under the Canadian Vocational Training scheme and the Department of Veterans Affairs, is included in the membership of the chapter. It is to these men who will be the experienced tradesmen of tomorrow that the educational program of the Society is directed. Through the medium of the Society's official publication, THE REFRIGERATION SERVICE ENGINEER, the distribution of educational films, printed lectures and the direction of proper technical reading material, the chapter hopes to fulfill its purposes. Under the Educational Committee Chairman, H. Parker, the chapter has done much in the past year to benefit and assist the members in solving all types of refrigeration problems which are confronted in the trade.

Gordon Roe, on presenting the charter to Jim Gibson, President of the Winnipeg group, stated that the local chapter had done much to further the aims of the R.S.E.S. and that in doing so had rendered better service to the many users of refrigeration devices through the education of its members. He said that the conveniences of cold were now well known and recognized

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WINNIPEG CHAPTER RECEIVES CHARTER

Presentation of the Winnipeg charter was made by G. O. Roe, June 13, in Winnipeg, Can. Left to right in the picture taken during the ceremonies are: F. P. Whalley, First Vice-President, Winnipeg; Jas. Gibson, President, Winnipeg; G. O. Roe, President, Interprovincial Association; and A. McIntyre, 2nd Vice-President of Winnipeg Chapter.

and that more than ever the efficient operation of refrigeration machinery depended upon the skill of the man who serviced it.

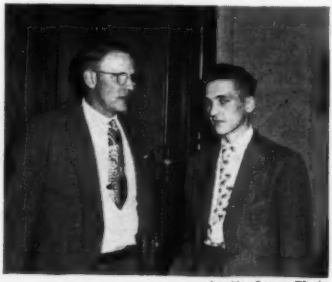
The Chairman, summing up the program of the past season, pointed out that the chapter in presenting a request to the Provincial Apprenticeship Board to have refrigeration men officially recognized as apprenticeship and journeymen tradesmen in Manitoba, was assuring a higher standard of workmanship to the benefit of the community. The days of exploitation were over, he continued, and the public realized it. He said that there were too many unskilled tradesmen who were a menace to the health and safety of citizens and to commercial users of refrigeration. If the Apprenticeship Board accepts the resolution of the chapter, he said, weeding out of these people would result. He called upon the chapter members to increase their knowledge of the trade through the continued support of the Society and its aims.

Following the presentation of the charter and a summing up of activities by the Chairman and Officers, an entertaining program was presented.

INTERNATIONAL R.S.E.S.
CONVENTION
CLEVELAND—JAN. 21-24, 1948

MARION, OHIO, RECEIVES CHARTER

EARL YOCKEY, International Director presented the charter to the newly formed Scioto Chapter at Marion, Ohio, on June 19th. Officers of the chapter are: Jack



Austin Jones Photo

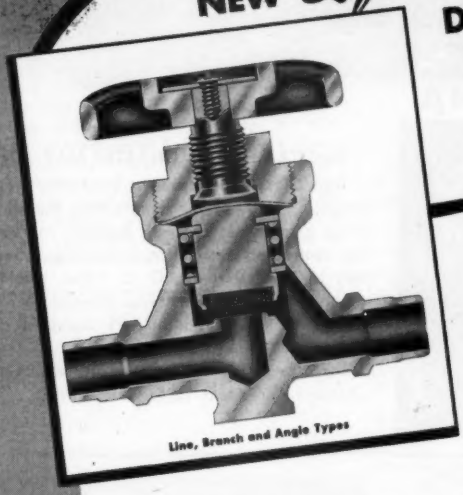
International Director Earl Yockey and President Croushore.

Croushore, *President;* H. R. Garey, *1st Vice-President;* L. B. Morse, *Secretary-Treasurer;* and N. P. Hoffman, *Sergeant-at-Arms.*

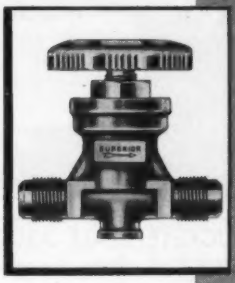
An attendance of approximately fifty were present to witness the ceremonies and to participate in an educational lecture on Temprite cooling equipment.

The new chapter has started on an active program and expects to conduct many interesting educational meetings.

NEW *Life-Time* DIAPHRAGM PACKLESS VALVES



Line, Branch and Angle Types



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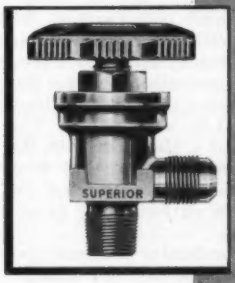

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SEATTLE RECEIVES CHARTER MAY 15TH

Top: Officers and speakers at charter presentation. H. G. Stern, representing the wholesalers association; Sherman Bushnell, representing contractors association; International Secretary H. T. McDermott; O. C. Yates, president of chapter and International Director; W. W. Pelkey, 1st vice-president; J H. Campbell, 2nd vice-president.

Left: Secretary McDermott presents Seattle charter to President Yates.

BUCKEYE STATE ASSN. PICNIC

BUCKEYE State Association held an annual meeting and picnic June 21 and 22 in Youngstown, Ohio. Headquarters for the affair was at the Pick-Ohio Hotel in Youngstown and the picnic was held at the Chestnut Hill Pavilion, Mill Creek Park. The attendance for the event was about 200.

Saturday afternoon, June 21, was devoted to registration. A buffet supper was served Saturday night at the Pick-Ohio Hotel, followed by a floor show. The floor show included a Hawaiian Trio, the Top Hatter—accordionist, and Carl Waldman—Man of Magic. Numerous prizes for the kids from six to sixty-six were given out during the show.

The Sunday program opened with a soft ball game between George Schuld's team and Jr. Nichols' team. In the last inning the Schulds were unable to get the Nichols team out and gave up. The picnic lunch occupied the noon hour and during the afternoon various contests were arranged to include all ages. There was fishing, golf, badminton, horseshoes, horseback riding, boating and swimming, and games and races for adults and kids. Prizes were awarded for each, in addition to the door prizes. Those who did not indulge in the sports enjoyed a tour of Ohio's most beautiful park.

Above: Oren Nichols, Jr., President Buckeye State Association acts as the magician's "foil." Below: Time out to discuss service problems.

A short business meeting was held Sunday afternoon to discuss arrangements for a mailing list of state members.

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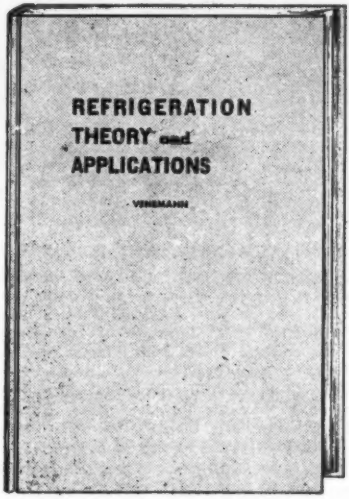

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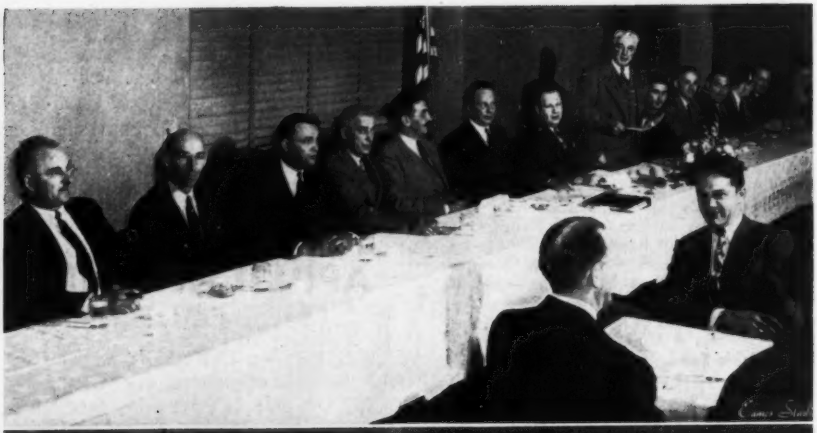

GRANITE STATE CHAPTER ENJOYS CHARTER DINNER

An enjoyable dinner preceded the presentation of the charter to Granite State Chapter, June 24, in the Carpenter Hotel, Manchester, N. H. Officers and guests, seated at the speakers' table pictured above are left to right: Ralph Wagg, Secretary Dirigo Chapter, Lewistown, Me.; Einar Kolvig, 2nd Vice-President, Granite State Chapter; J. Lawrence Hall, Chairman of Educational Committee, Granite State; William Tierney, President, New England States Assn.; James McCue, President of Boston Chapter; Charles C. E. Harris, International Vice-President; H. T. McDermott, International Secretary; Harry H. Cobe, President, Granite State Chapter; Richard Cressy, First Vice-President, Granite State; H. E. Humphreys, Chairman of Membership Committee, Granite State; Lane Fearon, Sergeant-at-Arms, Granite State; E. N. Solderberg, Treasurer, Granite State; Robert Harlow, Vice-President, Dirigo Chapter; Harold R. Wentworth, Secretary, Granite State.

Pictured below are some of the members and guests who sat down to the dinner preceding the meeting.

GRANITE STATE CHAPTER RECEIVES CHARTER

ON TUESDAY evening, June 24th, 85 men gathered at the Carpenter Hotel in Manchester, N.H., for the formal presentation of a charter to the Granite State Chapter. The presentation was preceded by a banquet.

H. T. McDermott, International Secretary, presented the charter to Harry H. Cobe, Granite State Chapter President, and was assisted by Charles Harris, International 2nd Vice-President; William Tierney, President of New England States Association; and James McCue, President of Boston Chapter. Arthur Andreen, 1st Vice-President of New England States Association; Robert Harlow, Vice-President of Dirigo Chapter, Lewiston, Me.; and Ralph Wagg, Secretary of Dirigo Chapter were also present.

Chapter officers were installed by Mr. Harris and consist of Harry H. Cobe, *President;* Richard Cressy, *1st Vice-President;* Einar Kolvig, *2nd Vice-President;* Harold R. Wentworth, *Secretary;* Elmer N.

contents

Refrigeration KNOW-HOW

The new Kold-Hold Catalog is a book of benefits and savings. It contains refrigeration know-how . . . information relative to the better storage and transportation of perishable products at lower costs. This catalog shows that Kold-Hold Serpentine Plate Type Evaporators have no equal in efficiency and dependability for locker plant space cooling, for shelves and stands in sharp-freezing or as cabinet liners, shelves or dividers. It explains how "Hold-Over" Plate Type Evaporators maintain the temperature of delivery bodies at the uniform level necessary in the successful transportation of fresh meat, ice cream, frozen foods and other perishables.

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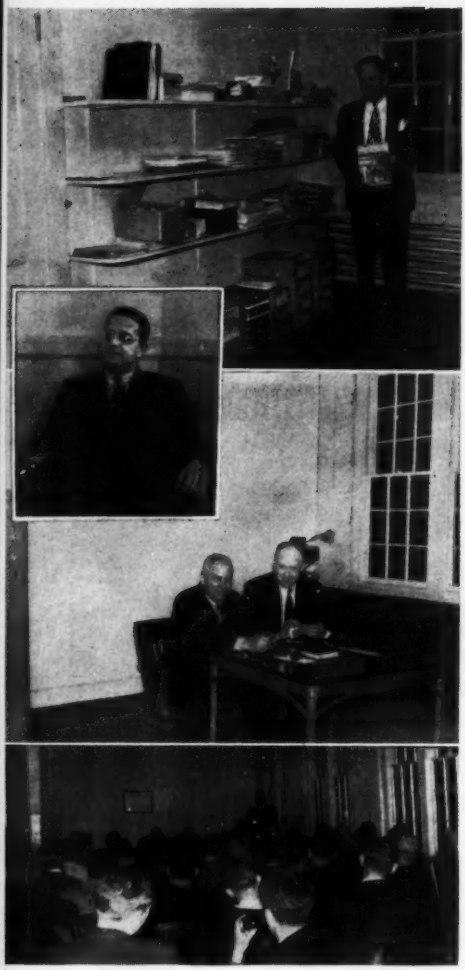

NEW HOME OF WORCESTER CHAPTER

Views of the new permanent headquarters of the Worcester Chapter, provided by Robert W. (Bob) Sheperdson, shown in inset. Included in the quarters is a library, pictured above, with Marshall Lewis the Librarian.

Pictured center are: W. E. Tierney, past President of Worcester Chapter and present President of New England States Association, seated beside John Brosnan, re-elected Secretary of Worcester Chapter.

The lower picture is a general view of the meeting in the new quarters.

Soderberg, *Treasurer;* Lane Fearon, *Sergeant-at-Arms; J. Lawrence Hall,* Chairman *of the Educational Committee;* and H. E. Humphreys, *Chairman of the Membership Investigating Committee.*

Formation of the chapter was begun in March, spearheaded by energetic Mr. Cobe, who operates a wholesale outlet in Manchester, and in three meetings 67 applications for membership were received. The chapter will serve the entire state.

✕ ✕ ✕

WORCESTER CHAPTER IN OWN PERMANENT HOME

WORCESTER Chapter, Worcester, Mass., has the unique distinction of occupying its own permanent quarters. Occupying a space approximately 40 by 125 feet at 21 Union Street, it can comfortably accommodate the meetings of the chapter and includes a chapter library for the benefit of the members, which is being constantly enlarged.

Working with the chapter and a member himself, Robert W. Sheperdson, president of The Standard Supply Co., Worcester, Mass., refrigeration wholesalers, provided the accommodations the chapter enjoys. Mr. Sheperdson set aside part of the space occupied by his business for the exclusive use of the chapter. The members are cognizant of the splendid contribution Mr. Sheperdson has made in advancing the chapter's activities.

Established in 1937 with 18 members, the chapter now numbers approximately 90 members. Of the original charter members, H. P. Goodney, James E. Hamel, Samuel Salters, William Viner, Samuel Gaffin, Peter Gargulinski, Michael Colbert, John Osper and George McKiernan are still members.

The move of the chapter to the permanent headquarters was inaugurated during the regime of Wm. E. Tierney, immediate past president of Worcester Chapter and president of the New England States Association of the RSES. Present officers of the chapter are: Francis L. Foley, *President;* Wilrose J. Hanson, *1st Vice-President;* James M. Stevenson, *2nd Vice-President;* John J. Brosnan, *Secretary;* Robert D. Horton, *Treasurer;* Edmond E. LaFlamme, *Sergeant-at-Arms;* and Marshall W. Lewis, *Chairman, Educational Committee.* Directors—Myron A. Maynard, Harry C. McCoy, Francis H. Turner.

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The first organizational meeting of the North Montana Chapter was held Jan. 20, in Great Falls, Montana, and it was on this occasion that the above dinner view was taken. The chapter has grown in number and in interest to its members since that date and is off to a very good start.

NORTHERN INDIANA CHARTER PRESENTED

NORTHERN Indiana Chapter, Hammond, Indiana, was formally chartered on June 25th when Edward Riccio, President of Greater Chicago Chapter, presented the charter to this newly formed organization. A dinner preceded the charter presentation and a full attendance of members were present to receive the obligation.

SOUTHWESTERN MICHIGAN

A NEW Michigan chapter at Kalamazoo officially entered the International Society when the Southwestern Michigan chapter received its charter from International Director Earl Yockey, Columbus, Ohio, on July 15.

An excellent repast preceded the official presentation. Mrs. Ila Harris Pool, manager, Kalamazoo branch of Harris Supply Co., was an active worker in the organization of the chapter.

ILLINOIS STATE PICNIC

THE Illinois Association held their annual picnic in Forest Park, Bloomington, Ill., July 13, with approximately 75 in attendance.

The location was ideal for the picnic, as swimming and boating facilities were immediately adjacent to the park. Arrangements to appeal to all had been made, such as softball, bingo and horseshoes. For those who take their picnicing more leisurely, a band concert could be enjoyed.

SOUTHWESTERN MICHIGAN CHAPTER

Southwestern Michigan Chapter personalities: Above—Mrs. Ila Harris Pool, manager Kalamazoo branch, Harris Supply Co., and one of the active organizers of the chapter; International Director Earl Yockey, Columbus, Ohio, who presented the charter; and Gene Newman, Newman Refrigeration Co., Battle Creek, president of the chapter.

Below—The officers, left to right: Ralph Wilkin, Kalamazoo, Secretary-Treasurer; Merritt Pike, Doster, Sergeant-at-Arms; Henry Hilborn, Battle Creek, Vice-president. Seated, Gene Newman, President.

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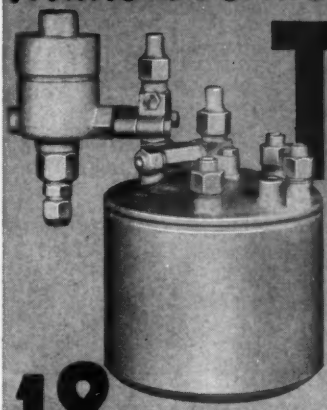

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Water coils are submerged in the liquid refrigerant itself and the heat of the liquid being cooled, passes directly into the main body of the refrigerant. Exclusive Temprite design gives instantaneous heat transfer.

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Temprite coolers are made to fill a wide range of temperature needs. Super-sensitive control valve assures constant temperature under all operation conditions.

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TENNEY DEMONSTRATES EVAPORATOR BEFORE LARGE GROUP

ABOUT 500 refrigeration service men from the Metropolitan area recently gathered at Continental Auditorium to hear about and see the Tenney glass evaporator and other Tenney products. They also were given a verbal preview of new Tenney products soon to be announced to the whole industry.

This meeting was one in the continuation of the series started last year in response to requests by R.S.E.S. chapters and jobbers. Specifically they wanted demonstrations of the Tenney thermostatic expansion valve using the glass evaporator, which was exhibited for the first time at the Cleveland show.

Caravan Travels Far

So far the Tenney Caravan has covered more than ten thousand miles in the Middle Western and New England states in response to these requests.

Talks were given by Bill Wyrough on the glass evaporator unit and Tenney valves; by Engineer Tom Warren on the development of new products; and by Sid Shapiro, who exhibited and described various Tenney products. The address of welcome was given by President Monroe Seligman and the various speakers were introduced by Saul Schiffman, Treasurer of Tenney.

Besides Messrs. Seligman, Schiffman, Warren and Wyrough, other members of the Tenney organization present to greet the men included Cleve Sewell, Vice-President, who gave a short talk on his western trip; Milton Gershon, J. P. McCormack, Gordon Schultze, Ray Stackhouse, Byron Hathaway and Bill Collins.

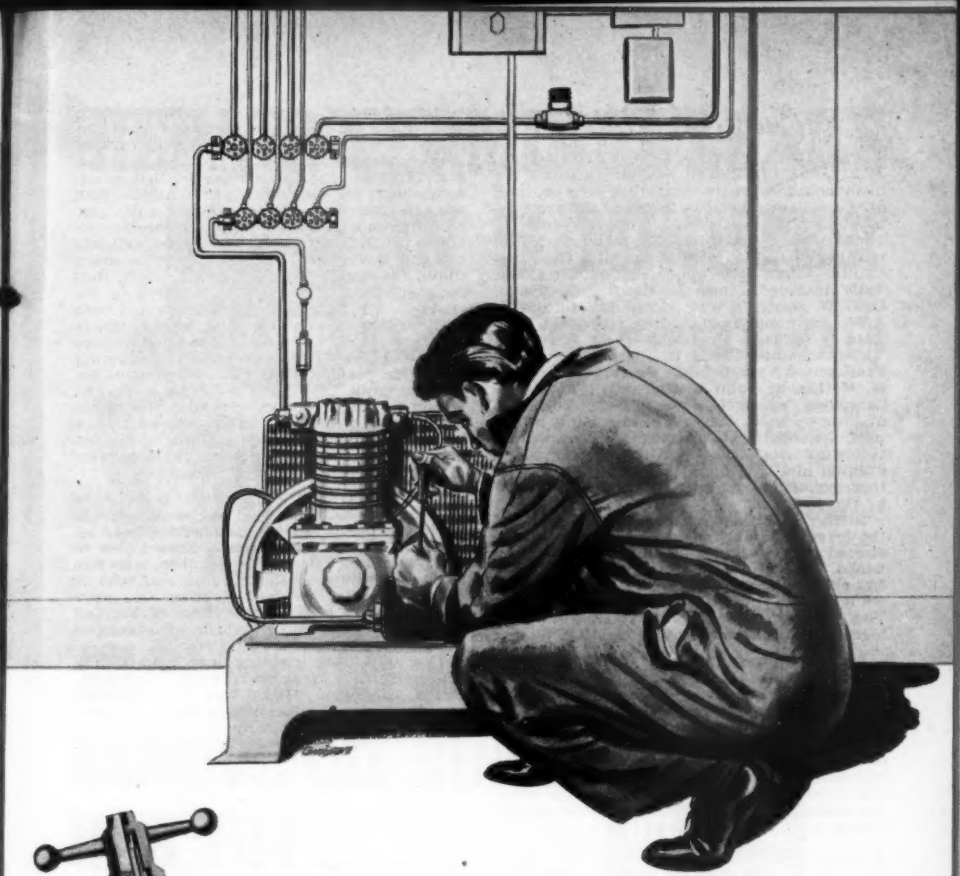
Door prizes were awarded to a dozen lucky men in the audience. After the talks, which were made as short as possible, a full hour's entertainment was provided and refreshments were served.

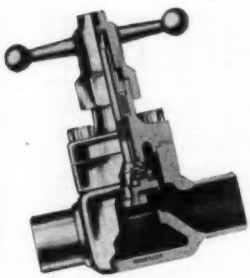
S S S

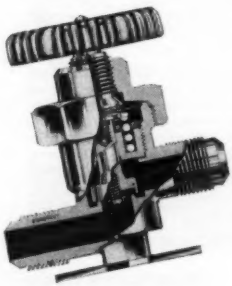
HUDSON-MOHAWK CHAPTER SEES TENNEY GLASS EVAPORATOR

THIS meeting was instigated by Tenney Engineering, Inc., for the purpose of demonstrating their products on the glass evaporator. R. B. Marshall welcomed all those present and introduced Mr. Dayton, President of the Hudson-Mohawk Chapter. Mr. Dayton in turn extended an invitation to all those present to join the Society. Mr. Marshall then introduced representatives of Tenney Engineering, Inc., who occupied the greater portion of the evening with a demonstration of the glass evaporator. A. M. Schmitz, member of the International Examining Board gave a pep talk on the advantages of membership in the Society.

Mr. Gardner, Secretary of the chapter, introduced old members present and invited non-members to see him personally. It was an extremely hot day but the attendance was exceptionally good, totaling approximately 225—63 of whom were students from the New York State Veterans Vocational School. There was no business meeting conducted at this time but one is planned for the near future at which time an election of new officers will be held. Refreshments were served following the meeting.







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Chapter Notes

• CENTRAL ARIZONA CHAPTER, *Phoenix, Ariz., June 10*—Eleven new applications for membership were read at this meeting and accepted to membership. Some of the arrangements for the forthcoming picnic were completed with a dance pavilion in South Mountain Park being selected as the site. The Nominating Committee appointed by President Tally included James L. Rardin, Chairman, Cecil D. Stodghill and Alfred M. Mathiason. After due consideration they presented their slate as follows: President—C. M. Tally; 1st Vice-President—James L. Rardin; 2nd Vice-President — Sam Bender; Secretary — Alfred M. Mathiason, John L. Rhoades, Wm. J. McLaughlin; Treasurer—Fred D. Perry; Sergeant-at-Arms—Joe W. Clark. The election is scheduled for the next meeting. A Tempscribe recording clock was raffled off during the evening and won by E. B. Marlowe, Jr. The treasury of the chapter was enriched by $5.50 by the raffle.

B. Ray Williams was the guest speaker of the evening and he explained and demonstrated the construction of ultra violet ray lamps. He showed why some lamps are only 5% efficient in their bacteria killing ability while other types have an efficiency of 45%. The talk proved very instructive. Refreshments were served after the meeting.

• CENTRAL CONNECTICUT CHAPTER, *Hartford, Conn., June 30*—The attendance at this meeting was small due to hot weather. However, the usual business period was conducted and a report was heard from Mr. Andreen on the new chapters formed in the state of New Hampshire and Vermont. A general discussion arose on the new state sales tax and it was decided to invite a speaker from the State Tax Department to speak on the subject at a future meeting.

• CENTRAL NEW YORK CHAPTER, *Syracuse, N. Y., May 13*—The meeting was held at the W. A. Case Mfg. Co. The guest speaker for the evening was J. W. Archibold of Temprite Products Company, who gave an interesting talk on the application of beer cooling systems, illustrating the subject with a series of charts. Following his talk Mr. Archibold answered questions from the floor. A buffet lunch and beverages, furnished by W. A. Case Co. and served by their employees, was enjoyed after the meeting adjourned.

At the June 10th meeting, two new applicants were accepted to membership. It was decided, due to the pressure of business and summer vacations, to dispense with the July and August meetings. A suggestion was made to hold a clam bake in the near future and H. B. Capron volunteered to make all arrangements. Refreshments were served following the meeting.

• CHICAGO CHAPTER, *Chicago, Ill., July 8*—During the early evening study session, Frank Frazee, Educational Director, talked on elements of salesmanship. It was a very interesting talk and one of considerable help to the man endeavoring to sell his services. R. L. Hendrickson talked on parliamentary law, providing the officers and members with information on the proper manner of addressing the chair, how to make motions and the procedure of voting. During the business session that followed, four new members were accepted to membership. They are: William Conden, Stanley Szmczak, E. C. Tonkler and Casmir Tyznicki. Pat Doyle reported that all arrangements for the annual picnic August 24th are now complete. The election of a delegate and alternate to the Illinois State meeting resulted in Ed. Riccio being elected delegate and Pat Doyle alternate. Frank Frazee introduced the speaker of the evening, F. D. Burroughs, one of the charter members of the chapter. Mr. Burroughs, now connected with Utilities Engineering Institute, gave a timely and interesting talk on air conditioning and the use of test instruments in air conditioning work. He demonstrated the anamometer, velometer, pitot tube, hand aspirator, sling and pocket psychrometer, and the Kator thermometer. Herman Goldberg gave a report on the California State Convention, telling of the aggressive growth of that section. The door prize of $5.00 was won by Joseph Dedich.

• DAYTON CHAPTER, *Dayton, Ohio, June 12*—The meeting was held at the Allied Supply Co. Application for membership was received from Earl Gardner and turned over to the Examining Board. Mr. Gardner, who was also the speaker of the evening and who is connected with Standard Register Co., gave an instructive talk on the value of keeping accurate records and provided some suggestions on methods of keeping records.

The June 26th meeting was held in the clubroom of the W. H. Kiefaber Co. The application of Byron Hicks was received and turned over to the Examining Board. Russell Wagner reported on the meeting of the Buckeye State Association at Youngstown, June 21 and 22. On the educational program a general discussion on service problems was conducted.

• ELM CITY CHAPTER, *New Haven, Conn., July 1*—The meeting was held at Resco's, 633 State Street, New Haven. The new officers for 1947-48, elected at the June meeting, were installed to office. Plans were discussed for the annual outing to be held at Restland Farms, Northford, Conn., on August 17th. Tickets are available at Resco's, located at the above address, for $5.00 each.

• FAIRFIELD COUNTY CHAPTER, *Fairfield County, Conn., July 15*—The picnic, to be held August 10th at the State Park, was reported on by E. Vogel, and he recommended that the tickets be sold for $1.00, plus tax. Some discussion was held on the annual convention of the New England State Association to be held on or about November 2nd in Hartford. A committee was also appointed to contact the police on emergency parking. Following the meeting refreshments were served through the courtesy of County Supply in Norwalk.

• FOX VALLEY CHAPTER, *Fond du Lac, Wis., June 4*—This was the annual meeting of the chapter and was called to order by President Fred Hansen. The Treasurer's report was read and accepted and a Nominating Committee appointed to elect the new slate of officers. They felt that the officers for the 1946-47 term had performed such a good job that they should be reinstated. However, some of the old officers felt that they were no longer able to devote enough time to succeed in the

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chapter and wished to withdraw. Final outcome of the voting was as follows: Fred Hansen, *President;* Marvin Summerville, *Vice-President;* Cliff Kelm, *Secretary;* A. Abraham, *Treasurer;* and George Theurwachter, *Chairman, Educational Committee.* Ernest Mueller was elected as District Representative to the State Association Board. Lee W. Casseta was elected to regular membership upon the motion of Fred Weigt, seconded by Ernest Mueller. After the business period was completed, Mr. Johnson of Peerless of America, Inc., talked about some of the new products being manufactured by his company. Refreshments were served after the meeting.

• GREENVILLE CHAPTER, *Greenville, S. C., June 11*—In the absence of President W. C. Lindley the meeting was conducted by V. W. Swan, Vice-President. Chairman of the Membership Committee, Wayne West, reported on the application of new members. The membership then voted to accept the following: Carlton E. Duncan, William L. Durham, J. W. Grahl, M. Harry Grace, Joe Thomas Hall, Harrison R. King, A. L. Lee, Ezra C. Price, Olon Price, G. A. Coates, and Lewis C. Black. Future meetings are to be held at Dave Stansels on the second Wednesday of each month at 8 P.M. A Dutch supper is planned for the next meeting.

At the July 9th meeting, eight new members were initiated by President Lindley. Following this a report on the price stabilization committee was given by Bill Williams and a discussion held on the subject. Additional reports will be given by the committee at the next meeting. Harrison King and L. C. Black were appointed to place an ad for the chapter in the local newspapers.

• HOUSTON CHAPTER, *Houston, Texas, July 8*—President A. T. Epperson opened the meeting with a request to those desiring advertising in the R.S.E.S. Reporter starting in the August issue, to get their ads in as soon as possible, since the bulletin would be twice as large in order to accommodate more members with advertising. On the educational program, A. A. Haney, Educational Chairman, introduced Fred White, who told of his experiences with refrigeration while employed by the Continental Oil Company. He spoke of the type of equipment the company used, which was built especially for dewaxing oil—a low temperature application requiring two and three staging. A general discussion was held on the subject following the talk and Mr. White answered the many questions asked by the members.

• INDIANAPOLIS CHAPTER, *Indianapolis, Ind., July* —After President Hartzog opened the meeting a discussion was held concerning a picnic to be held some time in August. Further details will be worked out later at a meeting of the officers. The door prize—an Allen socket wrench set—was won by Mr. Hoffmeyer.

The chicken dinner party, held by the chapter at Buckley's in Cumberland, Indiana, was attended by a large number of refrigeration men and their associates. Fifteen new members were treated to a free dinner and welcomed into the chapter. The new members were introduced by E. W. Wulf, who was master of ceremonies. Pictures were shown after dinner, and cards and dice were played by those who wished to join in. The party was a huge success and all present hoped for more such parties in the future.

• JOPLIN CHAPTER, *Joplin, Mo., July 9*—Two of the educational films "Adjusting and Repairing Thermostatic Expansion Valves," and "Servicing Water Cooled Condensers" were shown on the educational program. Discussion on the forthcoming National Convention in Cleveland came in for consideration. Joe Blake of Kerotest Manufacturing Co. was the guest for the evening. Refreshments were served upon closing.

• LA CROSSE CHAPTER, *La Crosse, Wis., June 27* — Former International President Clarence Buschkopf was present at the meeting and presented the chapter with a gavel for use by its president. Educational films shown on the program were "Servicing Water Cooled Condensers," and "Servicing the Thermostatic Expansion Valve." Annual election of officers resulted in the following: Harold Sargent, *President;* Alfred W. Roellig, Jr., *Vice-President;* F. A. Reiman, Jr., *Secretary;* Wm. Schomburg, *Treasurer;* and Arvid Deters, *Sergeant-at-Arms.* In a discussion regarding ways and means of paying for a movie projector it was suggested that the officers collect $1.00 per meeting for the fee.

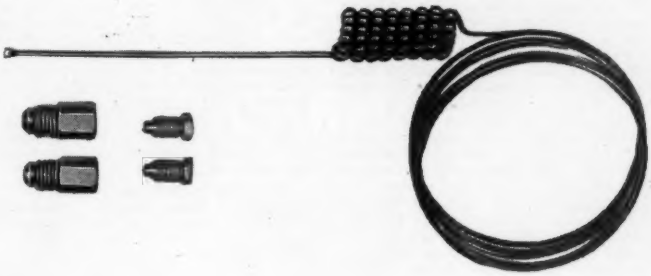
• MILE HIGH CHAPTER, *Denver, Colo., June 17*—This meeting was held in the shop of the Martin Refrigeration Company and its primary purpose was the annual election of officers. After following the usual procedure conducted by R. C. Kimmel, the results were as follows: Roy R. Roush, *President;* Chas. M. Sisson, *Vice-President;* Lyle L. Smith, *Secretary;* Harold Zeller, *Treasurer;* Frank Elder, *Sergeant-at-Arms.* Directors—L. W. Martin, L. M. Reed and C. J. Connell.

• MILWAUKEE CHAPTER, *Milwaukee, Wis., May 6*—The educational program for the evening included a question and answer session which lasted approximately an hour and a half.

At the June 3rd meeting business was suspended in order to allow as much time as possible to R. M. Locke and Harry Jorgensen of Minneapolis-Honeywell Regulator Co., who presented a very interesting educational program. President Bell reported on the meeting that the Code and Licensing Committee had with the city officials.

• OLD BALDY CHAPTER, *Pomona, Calif., June 20*—At the last meeting the annual election of officers took place with the following results: Harry B. Hollingsworth, *President;* Hal. B. Crumly, *1st Vice-President;* Darrell R. Smith, *2nd Vice-President;* Van F. Cleveland, *Secretary-Treasurer;* and Maurice Junod, *Sergeant-at-Arms.* Directors—Stillman Peck, Earl E. Marsh, Al. Boyer, R. E. Ready and Oscar Juno.

• ST. LOUIS CHAPTER, *St. Louis, Mo., June 24*—The meeting was presided over by President Roland Vizgird and his first announcement was that Mueller Brass Company would provide the refreshments for the evening. During the business meeting that followed, President Vizgird presented Past President Adolph Braun with a Past President's pin. Sam Wolff, as usual, had something for distribution. This time it was key chains from



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Brass & Copper Sales Company. Joe Pedrotti reported no questions in the Question Box and requested that members increase their activity in this department. Ed. Joern, local representative of Mueller Brass Co., provided the educational program for the evening. He began by inviting everyone to remove their coats for greater comfort. He then introduced P. O. Domke of Port Huron, Mich., Sales Manager of Refrigeration Products of Mueller Brass Co., who was the speaker of the evening. Mr. Domke gave a brief talk on his field experiences and a very interesting explanation of how copper tubing and streamline fittings are made. He illustrated his talk with pieces of copper tubing in the various stages of manufacture. He followed this talk with a demonstration of soldering streamline fittings, stressing the necessity of cleaning the tubing and fitting before applying flux, and the need of stirring the flux before application because ingredients have a tendency to separate. Ed Joern followed with a brief demonstration on the proper heat to apply to copper tubing and fittings using hard solder.

• SAN DIEGO CHAPTER, *San Diego, Calif., May 19*—The chapter was fortunate in securing William Hermes of French, Hermes and Thomas of Chula Vista, Calif. Mr. Hermes, who is a former engineer from Servel, and well qualified in giving a most thorough and interesting blackboard discussion about the absorption system. To many of the members, Mr. Hermes took extra time and patience to explain various points of the system. The old timers who were familiar with the old style ammonia absorption system were able to refresh their memory.

• TWIN CITIES CHAPTER, *Minneapolis, Minn July 1*—Chairman Asproth called the meeting to order and among the first committee reports was that of the Membership Committee presenting applications from Donald L. Jamieson for active membership, Erwin G. Homan for junior membership, Byron J. DeLange to be reinstated as active member, and Fred Miller who is now an associate member and requested that his membership be changed to active. The four applications were accepted to membership. Announcement was made that John Schank of Alco Valve Company will be present at the August meeting to demonstrate Alco expansion valves. He will use the glass evaporator in his demonstration. Tenney Engineering, Inc., have requested a special meeting of August 19th for the purpose of demonstrating their glass evaporator. After the adjournment of the business meeting, the educational film "Checking the Electrical System" and three films from the General Electric Company on electrical arc welding were shown.

• WESTERN MASSACHUSETTS CHAPTER, *Springfield, Mass., May 13*—Fred Binns of the Virginia Smelting Co., spoke on the subject of refrigerants, demonstrating his talk with different colored balls representing the chemicals involved. The talk was of a highly educational nature and keen interest was taken in it by all those present.

During the May 26th meeting, considerable discussion arose on the electrical code and licensing of refrigeration men in the state of Massachusetts.

The June 10th meeting was occupied primarily with a demonstration by Tenney Engineering Company of their glass evaporator. The meeting took place at the French Club, with Bernard Pactor and William Wyrough of Tenney Engineering Company, presenting the demonstration. A sound film shown by Tenney was a part of the evening's program.

• WOLVERINE CHAPTER, *Lansing, Mich., July 14*—This was to be the chapter picnic at the County Park, but due to rain it was held at the usual meeting place. A picnic supper was served, then Austin Boyer showed movies to the 40 in attendance. Coca-Cola and ice cream cones were served as an added treat.

ASRE ISSUES PAMPHLET ON HOSPITAL AIR CONDITIONING

THE basic procedure for air conditioning a hospital is described in a pamphlet, "Hospital Air Conditioning"—Refrigerating Engineering, Application Data 38, recently issued by the American Society of Refrigerating Engineers, 40 West 40th Street, New York City.

The pamphlet mentions certain factors which should be kept in mind when planning to air condition a hospital. It should be noted that patients want rest, relaxation from disturbing elements, and quiet. For these reasons, particular care must be given to the installation, but construction and operating costs are still of the utmost importance.

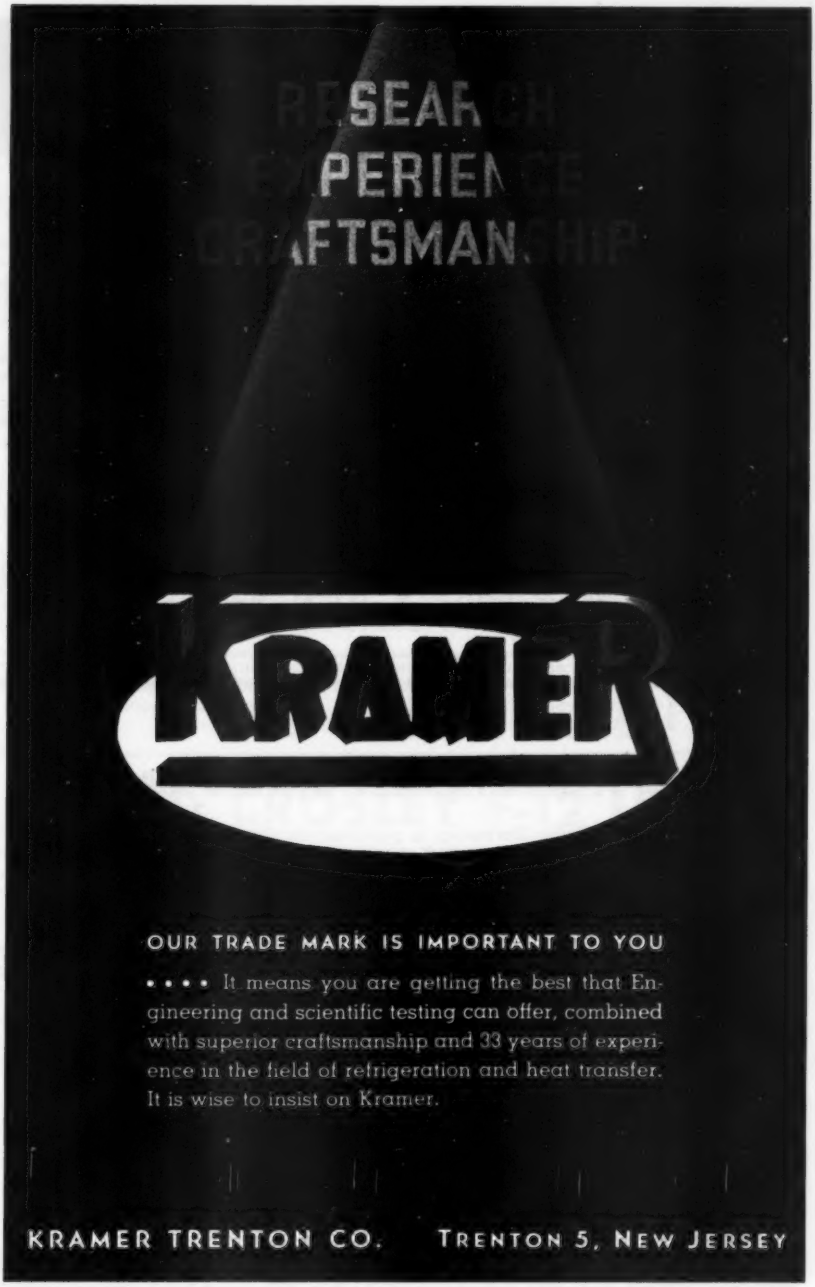
AD 38 was prepared by W. S. Bodinus, Chicago district manager of the Carrier Corp. and chairman of the ASRE Technical Committee on Hospitals and Institutions.

Among the subjects discussed in this pamphlet are the methods of air conditioning patients' rooms, public spaces, diagnostic and treatment rooms, operating, delivery and anesthesia rooms, and nurseries. Data on installation and operating costs of the refrigerating equipment are also given. The pamphlet is priced at 20c and may be obtained from ASRE headquarters.

S S S

HOME FREEZER MANUFACTURE

SINCE the end of the war, the refrigeration industry has produced an estimated 150,000 home freezers, and production is proceeding at the rate of 8,000 to 10,000 a month, depending on supplies of sheet steel and other materials. Manufacturers concentrating on the farm field are said to have shown greater sales and production increases than producers of equipment sold by urban dealers.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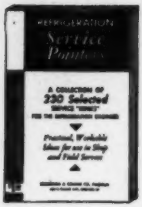

How many times have you wanted an idea that you could use—to test equipment—something you could build in your own shop; or special shop equipment that would expedite your overhauling and rebuilding work; or special tools to save you time. Here for the first time in handy book form, is a collection of over 230 practical, workable refrigeration service pointers.

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128 pages

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BOOK REVIEW

AIR CONDITIONING AND ELEMENTS OF REFRIGERATION, by Samuel P. Brown, 644 pages, cloth bound. 27 chapters and appendix. Price $6.00. Published by McGraw-Hill Book Co. For sale by Nickerson & Collins Co., 433 North Waller Ave., Chicago 44, Ill.

This book shows how to calculate heating and cooling loads, and how to heat, cool, ventilate and otherwise condition air in any building. Selection of equipment, automatic controls, and the design of air ducts and liquid piping systems are thoroughly covered. Refrigeration theory, application and equipment selection are also included. The book contains all the tables necessary for elementary design work, although complex theory and higher mathematics have been eliminated. It is an excellent reference book for those actively engaged in air conditioning and refrigeration work, and will be a valuable guide to those entering the field.

NEW ASSOCIATION OF AIR CONDITIONING MEN FORMED

ARTICLES of incorporation for an association of air conditioning business men was filed recently in Caddo parish clerk's office Shreveport, La.

B. Segall, Jr., was named president of the Air Conditioning Refrigeration Contractors Association of Shreveport; A. H. Otto was named vice-president; R. M. Hood was named secretary and E. J. Kearby was named treasurer in the articles.

COOLER AND TEMPRITE SYSTEM

(Continued from page 62)

Temprite off, it will run O.K. without cutting the overload out. The head pressure is around 160 lbs., and I have purged the condenser until it showed a shortage of "Freon."

ANSWER: Undoubtedly the trap in the suction and liquid line going to the tap box is one of the causes of your trouble. This trap will probably accumulate some oil which will reduce the effective area of the suction line and may be the main reason for the unit cutting out before it has actually reached the desired temperature. This, in turn, would be the probable reason why the unit cuts in much too soon, or in other words, the pressure builds up too rapidly after the unit has cut off.

You have given me no indication of what the load is on this unit and therefore I cannot be sure of the following statement. The high head pressure can be due to either insufficient condenser surface or to an overload on the condensing unit. It would seem that a two horsepower unit should be able to handle this size of cabinet plus the Temprite cooler. However, the amount of beer drawn through the cooler and the construction of the storage room would be the governing factor whether this unit can handle the job.

One way of adding a little additional capacity to the unit would be to insert a heat exchanger between the compressor outlet and the condenser which could be water cooled, acting as a small auxiliary water cooled condenser.

Another possibility of this overload condition is that your two-temperature valve is set with too wide a range. If it happens occasionally that both the Temprite cooler and the temperature valve calls for refrigeration at the same time, and supposing the two-temperature valve has a high cut in pressure, the total suction pressure at the compressor would become quite high for a short period of time throwing excessive load on the compressor and possibly causing the overload to cut out.

ARMY ICE CREAM PLANT

(Continued from page 38)

motors and expansion valves, everything else was constructed at an Army overseas depot.

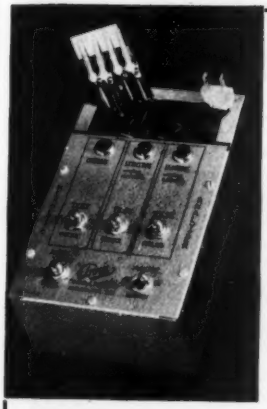
Condensing Unit

The condensing unit consisted of two compressors operated by separate motors using the same water-cooled condenser and receiver. Methyl chloride was the refrigerant. One British and one American compressor were used. The second compressor was placed in operation during the time the freezer was in use or mix was being cooled from 175 F. to 35 or 40 F.

Freezer Construction

The freezer was made of sheet brass with 1¼" copper tubing rolled around the inner cylinder, which with the outer cylinder was brazed at one end to ¼" brass plate. The space between the two cylinders was then filled with solder* in order to insure good heat conductivity to the inner cylinder, thus bringing the weight up to 125 pounds. The scraper and whippers were made of brass driven by a stainless steel shaft that extended to the bottom of the freezer stand which was V belt driven at 310 rpm. Ther-

*So this is where the solder went that we couldn't get at home. Perhaps the boys drank the alcohol.—Editor.



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Newcomers in this field also find they can go ahead with more confidence in themselves when they are backed by proper training the U.E.I. way.

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mostatic expansion valves were used as refrigerant controls with heat exchangers on the suction line. To make ice cream, all that one needed to do was start the agitator motor, open the liquid line shut-off valve and add mix.

Hardening Cabinet

The hardening cabinet was constructed of plywood with 6" of rockwool and granulated cork insulation. Three hundred and seventy-seven gallons of brine holdover solution were enclosed in a tank that lined the inside walls of the cabinet. A check valve was made and installed on the suction line just after the second heat exchanger. The coil in the brine tank consisted of 285 feet of hard drawn ⅝" copper pipe submerged in the brine. Most of the ice cream cans were rectangular and tapered, made of stainless steel. The temperature was held between —12 F. to —25 F. The cream was served before it became too hard. Good air circulation around the cans was insured by use of an electric fan. The author found this of utmost importance. From time to time, the hardening cabinet was used as a freezer for fresh meats.

Mix Storage and Cooling Tank

The mix cooling tank was a round double stainless steel tank capable of holding 167 gallons of mix with brine and refrigeration coils between the outer and inner tank. Using a bomb hoist reduction gear assembly with stainless steel blade on the end of the shaft revolving at 14 rpm., kept the mix properly agitated. An automatic expansion valve was used as the refrigerant control. The mix, after being cooked, reached the cooling tank at about 170 F. and within 5 hours was brought down to about 35 F. At times, cooks used the mix at 130 F. and the only effect on the operation of the freezer was that it took 18 minutes to freeze a five gallon batch.

The entire plant had to pass rigid medical department inspections including bacteria tests at frequent intervals. There was never a report of a high bacteria count.

The design and construction of the entire plant was made from memory of refrigeration data and much to the surprise of the author, who was the designer and constructor, the plant worked perfectly from the day it was placed in operation. The construction of this plant could have been eased considerably if so many improvisions had not been necessary due to lack of proper equipment or material.

S S S

THE EVAPORATIVE CONDENSER

(Continued from page 37)

of stainless steel or other non-rusting metals. Many of the older evaporative condensers are subject to rusting. Rust spots should not go untended, but should be scraped, sanded and repainted.

Twenty-five years ago evaporative condensers were practically unknown although spray ponds and cooling towers were in wide usage but only in the large tonnage sizes. Today the evaporative condenser is enjoying increasing popularity. With the expanding use of air-conditioning requiring large tonnages, city water and sewerage systems are being taxed and overtaxed to handle the amounts of water required and the sewerage needed for disposal of the warm water. It appears likely that the use of the evaporative condenser is due for further expansion. The service engineer will do well to acquaint himself with the service problems connected with this device and the business possibilities connected with its installation and service.

S S S

LOW COST OPERATION

(Continued from page 33)

Many service operations are so familiar as to be obvious, such as correct refrigerant charge, keeping air out of the condenser, compressor maintainance, especially valves, but because of their familiarity, should not be overlooked.

Many utilities will cooperate by installing a recording watt meter or Kwh. meter on a circuit and loaning it to their customer until he can get his equipment in efficient operation.

Any overall attempt to gain maximum economy will take considerable judgment but, in general, the following conditions contribute to economy.

1. Low discharge pressure. 2. High suction pressure. 3. Ample water supply without waste. 4. Large coil capacity. 5. High air velocity over coils, condensers, cooling towers, etc. 6. Moderate compressor speeds. 7. Correct valve adjustment. 8. Adequate suction line. 9. Ample wiring. 10. GOOD MAINTENANCE AND REGULAR INSPECTION.

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HERE'S an extra margin of safety for your refrigeration equipment. SAFETY HEADS protect against ruptured receivers, tubing . . . save compressors when control valves fail. Thousands in use. Put them to work for you!

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Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

Thermometer

A FAST freeze thermometer designed by the Instrument and Gauge Division of The Electric Auto-Lite Company, Toledo, Ohio, is available for use in home fast

freeze units. The above thermometer assures the housewife in a quick glance that the unit is functioning properly, at zero, insuring healthful preservation of the food stored. The thermometer registers temperatures from minus 20 to plus 15 degrees.

Alarm

ANNOUNCEMENT of the Freezer Sentry—a positive alarm of trouble for all frozen food cabinets — has been made by Jewett Associates, Buffalo 8, N. Y.

This Freezer Sentry warns of trouble when temperature inside the cabinet rises to 12F. It operates on a simple principle. When the temperature rises, a drop of mercury falls to the bottom of the tube making an electrical contact. No thermostat to get out of order—positive as gravity.

The buzzer operates on two flashlight batteries. A trickle charger, connected to the electrical circuit, insures a 5-year life of the batteries. It provides 100 hours of con-

tinuous operation of the buzzer. The Freezer Sentry can be installed by anyone on any home or commercial freezer.

With the average freezer storing over $100 worth of food and with so many possibilities of refrigeration breakdowns such as blown fuses, leaks in refrigerant lines or mechanical failure, the Freezer Sentry is cheap insurance against possible food losses.

Threading Machine

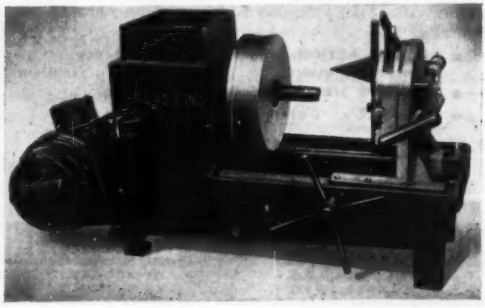
THE Century Thread King, a new portable pipe threading machine, is announced by Century Engineering Company, Los Angeles designers and manufacturers of precision boring equipment. The machine is easily adaptable to permanent installation or it may be used as a portable unit which can be moved from job to job.

Constructed of a special tough heat-treated aluminum alloy and weighing only 220 pounds, the Thread King cuts, reams, and threads pipe of ½ to 2 inches in diameter. Larger sizes up to 8 inches may be handled with a special drive shaft.

Employing many features new to the pipe threading field, the Thread King is of unusually clean design and its simple construction and operation makes it ideal for fast pipe work by inexperienced operators.

Instantaneous changing of pipe sizes is accomplished by a special Century chuck with a selector dial. By turning the selector dial to the required pipe size, the one movable clamping jaw with serrated and hardened teeth gives a positive grip even on short nipples. The elimination of all but one clamping jaw reduces the number of wearing parts and gives extra freedom from binding by dirt and cuttings.

For reaming, a specially designed movable reamer is used. This can easily and



GET THE JOB OPERATING FASTER!

NEW Premier Kit RECONDITIONS RECESSED OR FLUSH VALVE PORTS IN MINUTES!

Now you can easily grind, finish and test recessed or flush valve seats (either piston or flapper jobs) . . . get 'em back into action faster . . . and make satisfied customers! No more tiresome hand-lapping.

COMPLETE SET PACKED IN HANDY CASE

Contains self-aligning tool holder, 6 abrasive wheels for roughing, 6 cast iron lapping disks, two 3" cast iron lapping blocks, 1 wheel dresser and 1 valve tester. Complete instructions enclosed for handling ½" to 1¼" valve seats.

SEE IT AT YOUR JOBBER!

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CESCO's Healthguard Fume Kit (No. 605) offers *triple protection* to refrigeration servicemen. Quick-change filter cartridges assure safety against ammonia, methyl-chloride and sulphur-dioxide fumes . . . *all in one convenient carrying case.*

The soft molded rubber face-piece of the fume mask, and the adjustable headgear assure a gastight, comfortable fit for every wearer. Large safety glass lenses give perfect visibility.

The CESCO Healthguard Kit provides *economical* protection because it is *moderately* priced.

Write for CESCO'S *No. 605 Safety Bulletin for complete information*

CHICAGO EYE SHIELD CO.
2340 Warren Boulevard
Chicago 12, Illinois

CESCO
FOR SAFETY

quickly be lowered into operation and backed out and raised clear when reaming operation is completed. A forward motion immediately starts the die cutting.

Because of their quality and availability at almost any hardware or plumbing store, Armstrong adjustable dies are provided with the Century Thread King. The die holder is of the quick opening, partial floating type. Its simplicity and hardy construction assures long life and trouble free operation. Size changes can be accomplished quickly and easily.

A wheel and roller cut-off, also chosen because of its long life and ease of replacement, is used on the Century Thread King. While the blade type is slightly faster, it requires an experienced operator, tool breakage is frequent, and tool adjustment for wear is difficult.

The Thread King's closed, heavy duty, one horsepower motor is mounted on a pivoted base. The motor weight provides belt tension. Three groove step pulleys give high, medium, and low speeds. Belt changes are made quickly and easily. Two spur gears, made extra heavy to insure long life, regulate speed.

Where electricity is not available, the motor can be removed and the base lowered to provide a support for a small gasoline engine.

The cutting oil pump is completely enclosed within the gear housing. It is a positive displacement type with a neoprene impeller which does not become damaged in the event particles of abrasive, cuttings, etc., pass through it. A pressure relief valve is provided in case the pump is operated while the regulator valve is closed.

Costly, complicated gadgets have been completely eliminated from the Century Thread King to insure an inexpensive machine suitable for pipe cutting and threading by inexperienced operators. Only the essentials for fast, quality work are included in the Century Thread King design.

Impact Tool

INGERSOLL-RAND announces a new universal electric, all-purpose Impact Tool.

Using standard attachments, it will apply and remove nuts —drill—ream—tap—drive and remove screws—drive and remove studs—extract broken cap screws and studs—run wire brushes—do hole saw work—drill brick and masonry—drive wood augers.

This new machine is designated as Size 4U. It weighs only 6½ lbs., has an overall length of 10½ in., a free speed of 2000 rpm, and delivers 1900 rotary impacts per minute under load. It is powered with a specially designed reversible motor.

The Impact Tool runs just as any conventional electric tool until the resistance to spindle rotation reaches a certain amount. Then a patented mechanism converts the power of the motor into "rotary impacts" which exert a more powerful turning effect than is produced by any other electric tool of comparable size.

An advantage of the impact mechanism is that it permits the spindle to be stalled completely while the motor continues to run; thus eliminating motor burn-outs caused by overloading.

The following operations can be easily performed with the Impact Tool using standard attachments:

APPLY AND REMOVE NUTS —The unit is conservatively rated to handle nuts and cap screws up to ⅝" thread size.

DRILL—Rated for ¼" drilling in metal—up to ½" by step drilling.

REAM—Reamers up to ½" diameter.

TAP—Taps from ¼" to ½".

DRIVE AND REMOVE SCREWS—All types of machine screws up to ⅜" thread size and wood screws up to size No. 20.

DRIVE AND REMOVE STUDS—Capacity up to ⅜" thread size.

RUN WIRE BRUSHES—Various types of wire brushes with round shanks up to ⅜" diameter.

WOODBORING—Up to ⅜" twist drills with collet-type chuck; up to 29/32" with Morse Taper.

DRILL BRICK AND MASONRY—Carbide-tipped drills up to ⅜" diameter.

Tester

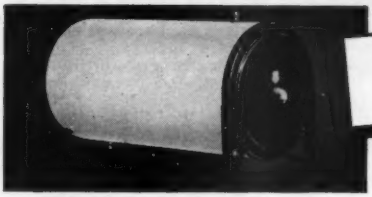
HERE is a new Cold Zone Tester for quick, accurate check of operating temperatures of refrigerating equipment.

Model 50-50, made by J-B-T Instruments, Inc., tests cold zones in the range of —50 F to +50 F, and gives continuous reading outside the equipment being checked.

The temperature element, small enough to be inserted in hard-to-reach places, has a 14 foot lead of polyethylene, a practically indestructible plastic. This lead stays flexible even at —50 F and is so thin it does not interfere with door strips.

This whole test unit is compact, extremely simple to use, and is moderately priced, so that scientific diagnosis can be made by service engineers.

REMOTE WATER COOLERS



NORMAL SUCTION PRESSURE

For drinking water bubbler service, glass filler service, photographic developing, etc. Compact for floor, wall or ceiling installation. Capacities 6 to 25 gallons.

Also available now—cafeteria glass filler coolers, self-contained type bubbler coolers for offices, stores or factories. Write for latest data.

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Mullion Unit

A NEW down draft cooling unit for placement behind the mullion of reach-in refrigeratiors, dough retarders, back bars, beverage coolers, etc., has just been announced by Tenney Engineering, Inc., 26 Avenue B, Newark 5, N. J., manufacturers of automatic temperature,

humidity and pressure control equipment, finned coils, ice makers, cooling units, thermostatic expansion valves and other types of equipment.

The announcement states that this new unit also may be placed at any one of several locations within the box by attaching the unit to the walls or ceiling by means of small angle brackets. Construction and size are such that very little usable space is occupied by the unit.

It is claimed that the smallest size of this Tenny Mullion Type Cooling Unit is adequate for average cooling load in boxes up to 30 cubic feet capacity. Two larger sizes will service boxes of 42 and 65 cubic feet capacity, respectively. For better distribution of cold air in large boxes the announcement states that the manufacturer recommends use of two small or medium sized units rather than one large unit. Cooling effect capacities of the three sizes are stated as 1600, 2500 and 3000 Btu. per hour based on a 15 F. temperature difference between box temperature and refrigerant.

It is stated that Tenney Mullion Units are made with polished aluminum casings, having the motor mounted on the wide air intake, with direct connected air circulating fan in the top of the casing. Fan is 8 inches in diameter and motor is rated at 1/70 hp.—1550 rpm. Capacity of fan is stated as approximately 160 cfm. of air.

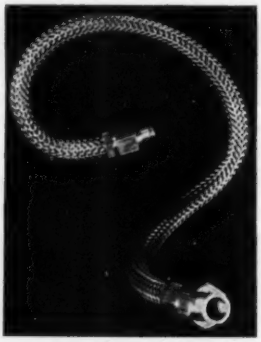
Manufacturer claims that baffled air outlets prevent eddies, dead spots and turbulent air over stored prolucts.

Size of units are given as 9"x10¼"x17" for the small units to 9"x27¼"x17" for the largest unit. Each unit is furnished complete with mounting brackets, motor, fan, Tenney TS-1 Thermostatic Expansion Valve, drip pan and outlet connection for draining condensate.

Metal Hose

THIS new seamless flexible metal hose is made of alloy seamless bronze tube. The tube is gently but firmly formed into a uniform helically corrugated, flexible hose, retaining the maximum desirable characteristics of the original tube.

This means greater flexibility, with longer life—the Uniflex method of manufacture eliminates the embrittlement caused by excessive work hardening—the resultant hose is a tough resilient, seamless product that is leak proof.



The flexing quality of metal hose is dependent upon characteristics built into the product, such as form, depth and frequency of corrugations, material and above all, a thorough knowledge of the behavior of the finished product under exacting service conditions.

To give additional safety, extra life, and prevent elongation, all Uniflex metal hose is encased in a high-tensile bronze wire braid. This sheath is permanently attached to carefully designed couplings that are built to "stand the gaff" and to relieve the hose itself of damaging strains.

The Uniflex fitting provides metal-to-metal seat by means of a seal produced between the fitting body and the spring washer effect of the hose, itself. No brazing or packing is required. Once the fitting is assembled it remains permanently leakproof.

The fitting is short, compact and permits the use of more hose length (and less fitting length) thus providing maximum maneuverability.

Cleaner-Blower

IDEAL INDUSTRIES, Inc., 1568 Park Avenue, Sycamore, Ill., announce a new completely redesigned portable electric cleaner which has, among its many new features, increased cleaning action and the ability to run continuously 24 hours a day, if necessary.

The Ideal is the most powerful portable cleaner made. Powered with a 1½ hp. motor, the Ideal Heavy Duty Cleaner blows air at a velocity of 25,500 feet per minute. The total weight is only 14½ lbs. The Ideal Medium Duty Cleaner, with a ⅔ hp. motor, displaces air at 19,000 feet per minute. Weight—9½ lbs. Both models have precision type, sealed ball bearings and air stream cooling scrolls which permit continuous operation without overheating.

This new cleaner serves a multitude of industrial and commercial uses. It vacuums, blows, sprays or dries and is easily and quickly converted to any of its functions—a "4-in-1" versatility that reduces capital expenditure.

Vacuuming is the preferred method of cleaning, since it transfers the dirt into the bag. With powerful suction force, it cleans away dirt, dust and grime which accumulates on and around machinery and motors, generators and electrical apparatus—just about every plant can use one of these cleaners in their maintenance work. In general factory cleaning, it is useful in cleaning under stairs, closets, overhead pipes, floors and benches.

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Get to the best of thirst!

Smooth, easy, trouble-free action of the dial-type bubbler controls is just **one** of the OASIS features that assure longer-lasting, low-maintenance service in every type of installation. Offering both standard and commercial sizes for every need—with bubblers, glass fillers, or both—OASIS coolers provide full cooling and storage capacities in highly compact units of outstanding beauty and ruggedness. Every OASIS detail reflects EBCO's 20 years of leadership in the designing and building of electric water coolers. Write for proof!

OASIS
ELECTRIC WATER COOLER

The EBCO MANUFACTURING COMPANY

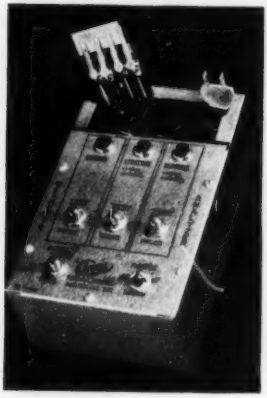
In some instances, the parts to be cleaned are encased or otherwise inaccessible, such as air conditioning, refrigeration and heating units. Generally the dirt has become oil soaked and heavy and requires blowing out. The Ideal Blower does the job easily and safely. The air is dry—and while velocity is high for adequate cleaning action, the low pressure prevents possible damage of blasting.

When not being used as a cleaner to vacuum or blow, the Ideal may be used as a sprayer for deodorants, insecticides—for paint, varnish, lacquer, etc. Its fine, even spray is unadulterated by moisture because only dry air is delivered.

If drying action is desired, a heater nozzle may be attached to the Ideal Blower which raises the air flow temperatured to a minimum of 85 degrees. It is useful in drying motor windings and electrical equipment to prevent shorts and corrosion—also used in drying paint, ink and any dampness that can't be removed by wiping.

Hermetic Analyzer

A NEW type of hermetic unit analyzer which the manufacturer claims will save time and wasted effort but, most important, will save money by promoting accurate estimating, has just been put on the market by Mechanical Enterprises of 7736 Tujunga Ave., North Hollywood, California. Known as "Annie" by servicemen because of its small, convenient size and extreme efficiency, this analyzer will, in a matter of seconds, positively indicate the nature of any defect in the electrical system. Even the layman observer can be shown just what is wrong; therefore "Annie" may be said to win friends and influence people. It is the serviceman's quick, "on the spot" method of finding out what is wrong without the necessity for transporting units to the shop and then going through elaborate tests. "Annie" is also guaranteed to provide the correct information that makes close estimates and accuracy not only possible, but a routine matter. "Annie" weighs only 1¾ lbs. and is 3" by 5" by 8" overall. With each unit of "Annie" goes an elaborate set of instructions which gives the serviceman the opportunity to realize the greatest benefits from its use.



Precision Oiler

A UNIQUE "automatic type" oiler or lubricator, designed to overcome the faults which are prevelant in many lubricators which attempt to spread minute drops of oil in exact amounts on delicate mechanisms, has just been brought out by Buck Products Co., Glendale, Calif. The new "Buck" lubricator which, incidentally, is priced at a "buck," ($1.00) is constructed of light metal in the general shape of a streamlined bullet.

Oil Separator

SEP-RETURN, a new automatic oil separator and return recently introduced by the Wabash Manufacturing Company of Chicago, incorporates many innovations of interest to the refrigeration industry. The manufacturer claims that the Sep-Return reduces electric power bills and provides more efficient refrigeration.

In operation, oil-laden hot refrigerant gas from a compressor enters the Sep-Return. The gas flows through a Poronze element which causes the oil to separate from the gas and trickle into the sump.

MODEL 2127 12.5 Cu. Ft.
Capacity about 625 lbs.

Write today for technical details and sales advantages of this leading among Farm and Home Freezers.

A precision engineered freezer that offers longer service-free operation at lowest power costs.

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Don't let them down for lack of refrigerant to recharge these FRIGIDAIRE units—
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Customers and servicemen alike are finding this gas measures up to their standards of performance in Meter-Misers. Servicemen experience no difficulty in making this replacement to the complete satisfaction of their customers. Meter-Miser service becomes a routine call to the shop that carries a supply of HERVEEN.

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News of the Equipment Industry

INDUSTRY JOINT ENGINEERING COMMITTEE MEETS TO SET UP CODE OF STANDARDS

REPRESENTATIVES from the entire refrigeration compressor industry met for the first time in the industry's history on June 30 and July 1, at Hershey, Pa., for the purpose of setting up a voluntary code of refrigeration industry standards covering condensing units up to and including 5hp. The men who met at Hershey were members of the newly named Industry Joint Engineering Committee.

Frank K. Smith, Sales Manager, Tecumseh Products Company, Tecumseh, Mich., the committee chairman, reported that the initial sessions were "successful," and that they marked one of the greatest forward steps in a long program of forming voluntary minimum standards in this fast growing industry.

The Industry Joint Engineering Committee was created on the basis of separate favorable votes by the Refrigeration Equipment Manufacturers Association and the Air Conditioning and Refrigeration Machinery Association. The REMA ballot for the appointment of such a committee was taken in Chicago on April 11 and the ACRMA vote for the same action followed four days later in New York.

Mr. Smith, as chairman of the joint committee, announced its membership as follows:

Brunner Manufacturing Company, Utica, N. Y. (J. W. Thomas, Sales Manager and Alfred D. Sullivan, Chief Engineer)

Carrier Corporation, Syracuse, N. Y. (Mark E. Mooney, Product Manager, Applied Refrigeration and Lars Hanson, Director of Development)

Chrysler Corporation, Airtemp Division, Dayton, Ohio (A. C. Newton, Chief Engineer)

Copeland Refrigeration Corporation, Sidney, Ohio (Oscar H. Buschman, Vice President)

General Electric Company, Air Conditioning Department, Bloomfield, N. J. (Frank H. Faust, Manager, Commercial Engineering Division, Committee Secretary)

General Motors, Frigidaire Division, Dayton, Ohio (J. L. Gibson, Manager, Commercial and Engineering)

Lynch Manufacturing Corporation, Defiance, Ohio (George C. Davis, Chief Engineer)

Nash Kelvinator Corporation, Kelvinator Division, Detroit, Michigan (George R. Kingston, Commercial Sales Department)

Servel, Incorporated, Electric Refrigeration Division, Evansville, Indiana (Clyde Ploeger, Chief Engineer)

Standards Engineering, Washington, D. C. (Leonard C. Bastion, Recording Secretary of the Committee).

Universal Cooler Corporation, Refrigeration Division, Marion, Ohio (William W. Higham, Chief Engineer)

York Corporation, York, Pennsylvania (Walter E. Landmesser, Resale Sales Division, Committee Vice Chairman and Henri A. Brysselbout, Chief Commercial Application Engineer).

S S S

DEMAND FOR NEW REFRIGERATORS MORE THAN 17 MILLION

DEMAND for quality refrigerators will keep ahead of production for another three years, L. H. D. Baker, vice-president of Admiral Corporation, told dealers attending the furniture show in Chicago recently.

Baker based his prediction on exhaustive studies made of the demand, need and conditions prevailing in the refrigerator industry.

Between V-J Day and the end of 1949, he said, there will have accumulated a demand for 17,644,000 refrigerators in the United States alone. By the end of 1946, only 2,400,000 had been produced, and so far in 1947 the rate has been approximately 280,000 units a month. At this rate, Baker said, it will take 54½ months to catch up with normal demand, assuring a steady market for all-out production well into 1950.

The figures on demand for refrigerators are shown in the table appearing on the following page.

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You Have a Constant
Source of Supply for

USED
REFRIGERATORS

We can furnish them "As Is" or "Reconditioned & Refinished." Our prices permit a large profit margin for you and the huge demand for refrigerators leaves you with no selling problem.

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for Future Reference

All Copies Are Punched to Fit Binder

Every issue of this magazine will have valuable information which you will want to retain for future reference.

Holds twelve issues—an entire year's supply. No hunting around for lost or missing issues. The entire year's edition is always handy.

The name of the magazine is attractively stamped on the cover in gold.

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THE REFRIGERATION
SERVICE ENGINEER
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CHICAGO, ILL.

I'M A NEW
Arlington Seal
Wise men use me because only my shoulder bone (ring) rotates with my contact (the shaft).
I can be installed easily and rapidly, saving man hours.
I am a uniform flat smooth seal with diaphragm synthetic rubber ring. All the way through I am made of the highest grade steel and bronze, precision finished to millionths of an inch.
All the better jobbers have me on their shelves or you can find out more about me by writing . . . .
MODERN DESIGN PRODUCTS CO.
"Arlie"
YOUR SEAL
ONLY THIS SHOULDER SEAL RING ROTATES WITH THE SHAFT
Arlington
SHAFT SEAL
MANUFACTURED BY
MODERN DESIGN PRODUCTS CO
CHICAGO 24, ILL.

TABLE SHOWING ANTICIPATED DOMESTIC REFRIGERATOR DEMAND

YEAR	NORMAL DEMAND FOR RETIREMENTS	DEMAND FROM ADDITIONAL USERS	TOTAL	ACCUMULATED TOTAL
at V-J Day and 1945	2,324,000	5,420,000	7,744,000	7,744,000
1946	1,017,000	1,438,000	2,455,000	10,199,000
1947	1,176,000	1,250,000	2,426,000	12,625,000
1948	1,322,000	1,175,000	2,497,000	15,122,000
1949	1,448,000	1,074,000	2,522,000	17,644,000
Totals	7,287,000	10,357,000	17,644,000	

Replacement estimates are based on figures showing the life expectancy of the average present-day refrigerator is 13.3 years. Additional new users are those created by marriages and farm electrification.

Since in 1941 there were approximately 3,600,000 refrigerators manufactured in the United States, at this rate—which was a prewar high—it would require nearly five years' production to fill this demand. The industry has fallen far behind this average rate in the 22 months since V-J Day, because of material shortages, so that the date of filling the demand is put still farther off, Baker said.

Unlike other products whose use may fluctuate widely in varying economic times, the refrigerator market is relatively stable, Baker pointed out. Every family unit needs some kind of refrigerator, no curtailing of the number of units is possible within the family, and the replacement rate is consistent.

These figures, the Admiral executive emphasized, do not take into account the export market, which he expects will become an important factor before the equalization point between supply and demand is met.

SEARS' COLDSPOT REFRIGERATORS "REAR-MOTORED"

SEARS, ROEBUCK & CO. recently introduced a new line of Coldspot refrigerators in its retail stores throughout the nation, featuring 30% larger storage space without over-all increases in size.

The new refrigerators have rear-mounted motor units instead of motors at the bottom. The new Coldspots, Sears spokesmen said, take up only as much space as other refrigerators two cubic feet smaller in storage space. The Sears models have from seven to 11 cubic feet of storage space, and retail from $189.95 to $289.95 in Chicago. Shelf area ranges from 13 to 21.1 square feet.

Seegar Refrigerator Company, with plants in St. Paul and Evansville, Ind., manufactures the refrigerators for Sears. Development work on the new line began in 1940 and was delayed by the war, T. V. Houser, Sears' merchandising vice-president, said.

WAGNER MOTOR REPAIR PARTS ASSORTMENTS AGAIN AVAILABLE

WAGNER motor repair parts are again available in two handy kits, the small M-1 for service men to carry with them, and the large M-2 for convenience and economy of stocking replacement parts in the shop.

The M-1 container is of heavy fibre, 11¾ inches long, 6 inches wide, and 1¾ inches deep. It contains a variety of 61 replacement parts most commonly needed in repairing appliance type motors up to and including ½ horsepower, including sleeve bearings, brushes, and switches. Shipping weight is 3 pounds.

The M-2 drawer-type container is of sheet steel, 24½ inches long, 13 inches wide, and

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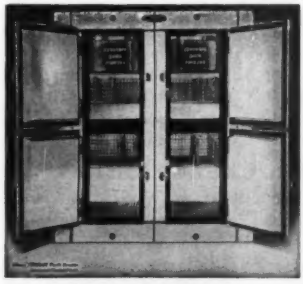

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4 inches deep. It contains an assortment of almost 700 fast-moving replacement parts for repulsion-start induction and capacitor-start motors up to and including 3 horsepower. Shipping weight is 46 pounds.

Each kit has a list of contents printed on the inside cover in order to simplify reordering.

RANCO WINS AWARD

THE Contact, recently established employee house organ of Ranco Inc., Columbus, Ohio, received a third place award at the annual meeting of the National Advertising Agency Network, held recently in French Lick, Indiana. Lou Levengood, Ranco Director of Personnel, is Editor of the "Contact," which is produced and edited by the Howard Swink Advertising Agency, Inc., the Ranco agency. The National Advertising Agency Network was formed in 1932 to help improve advertising standards and is composed of 27 member agencies located in strategic marketing areas from coast to coast.

MORE FREON IN FUTURE

KINETIC Chemicals, Inc., is installing equipment at East Chicago, Indiana, for the manufacture of "Freon" fluorine refrigerants which will increase the capacity by 75%. This plant is scheduled for operation in the spring of 1948. It is anticipated that there will be an adequate supply of these refrigerants during the busy months of next year.

MOUGEY NAMED AD CHIEF FOR ZEROSAFE FREEZERS

CHARLES R. MOUGEY, of Dayton, Ohio, has been named sales promotion and advertising manager of the Wilson Cabinet Co., Smyrna, Del., manufacturers of Zerosafe home and farm freezers, commercial refrigeration, milk coolers and other products.

Mr. Mougey has been in charge of advertising and sales promotion for the Airtemp Division of the Chrysler Corp., Dayton, Ohio, where he introduced and put into effect new plans of dealer advertising and dealer identification.

FOAMED PLASTIC CALLED "STRUX"

THE foamed "lighter than cork" plastic developed recently by the Du Pont Company and tentatively called CCA, the initials of its chemical designation, cellular cellulose acetate, has been given the trade-mark "Strux," the company announced today.

"Strux" is a core material for laminations with metal, wood and plastic skins. In laminations, the material imparts great strength with extremely light weight. It is also a good insulator against heat and noise.

Still being produced on a limited basis, "Strux" has already been successfully adapted in luggage, aircraft wings, panels and stabilizers, food lockers, boats, and refrigerators.

Among the uses forecast for the plastic are in railroad cars, sections of prefabricated houses, elevators, refrigerator trucks and trailers, and rigid insulation.

WINKLER RETURNS TO BRUNSWICK AS CHIEF ENGINEER

WYNN G. WINKLER returned to the Brunswick-Balke-Collender Company May 19 to resume the duties of chief refrigeration engineer, a position he held prior to going with the Reynolds Metals Corporation, Louisville, Kentucky, in April 1946.

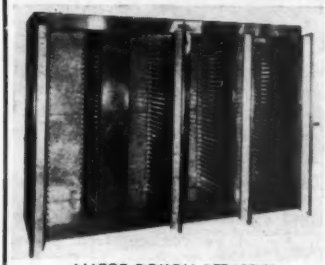
Mr. Winkler's background in refrigeration engineering covers a period of better than 20 years, not including training at Antioch College and three years of refrigeration at the University of Cincinnati. His direct experience began with Frigidaire in their research department in 1927 and later he was transferred to design and development. He went to the Crosley Corporation in 1932 and stayed until 1935 as chief of their refrigeration laboratory, and then joined Kold Hold Manufacturing Company as general superintendent for a year before returning to Frigidaire where he was in charge of design and development for the next eight years.

The position of chief refrigeration engineer has been vacant for the past few months although the duties were delegated to Frank Walsworth in the interim. Mr. Walsworth will continue in the capacity of assistant refrigeration engineer.

ADMIRAL'S NEW "MOISTROL"

DEVELOPMENT of a new moisture evaporator was announced by Admiral Corporation at the opening of the annual Furniture Market.

In the new model of its "Dual-Temp" refrigerator, on display, Admiral has elim-



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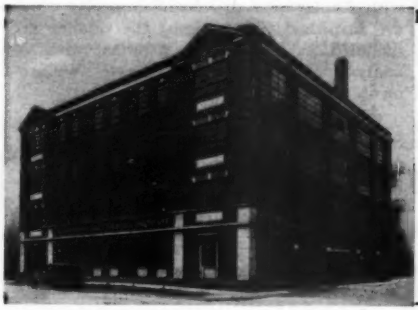

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inated the need for emptying the drip tray. Moisture condensed from within the storage space is evaporated from the pan through use of a warm coil, known as the "Moistrol," which uses heat generated by the unit.

This development, according to its makers, makes the new "Dual-Temp" the first refrigerator requiring no attention from the owner except in setting temperatures. Admiral already has eliminated the need for defrosting and for covering dishes.

Other features of the new refrigerator, which has the exclusive "Dual-Temp" feature of two separately controlled compartments for frozen foods and normal food storage, include a new shelf arrangement that increases available space, and changes in the exterior design for greater convenience to the housewife.

Although Admiral is producing refrigerators at a record rate, the company does not expect to meet the demand for more than a year, declared L. H. D. Baker, vice-president in charge of the appliance division.

S S S

LA CROSSE EXPANDS AGAIN

THE La Crosse Cooler Company of La Crosse, Wisconsin is continuing its expansion program which was undertaken about a year ago by the construction of a new factory building in La Crosse. This year the program calls for the construction of a spacious warehouse with 20,000 square feet of floor space and which is now rapidly nearing completion. This new addition to present facilities will make it possible for the company to carry a stock inventory of standard items in this diversified line of beverage cooling and dispensing equipment and, consequently, greatly improved delivery schedules on La Crosse equipment will be the result.

The new warehouse building is being constructed with both rail and dock facilities to meet the requirements of both railway and trucking companies.

S S S

KRUEGER NEW V.P. OF SEEGER

JOHN W. KRUEGER is the new Vice President and General Manager of the Seeger Refrigerator Company's Evansville Plant, according to an announcement made by Walter G. Seeger, President.

Mr. Krueger was formerly General Superintendent of Frigidaire's Plant No. 2, which employs more than 10,000 men. T. L. Pantz, also of Frigidaire, will be Mr. Krueger's assistant.

John S. Holl, General Manager of the Saint Paul Plant, who has been in charge of the Evansville Plant since Arthur J. Lowell left last spring to take a position with Sears Roebuck and Company, will return to his capacity in the Saint Paul Plant.

Mr. Krueger is forty-one years old, a graduate of Cincinnati University, with a Mechanical Engineering degree. He has been with Frigidaire for eighteen years, starting as Processes Engineer in the Refrigerator Design and Development. He became General Superintendent of that plant in 1940.

In his new position Mr. Krueger will take over the full operations at Evansville, where the new 1947-48 Coldspot Space Master is being produced.

S S S

NEW CATALOGS AND BULLETINS

FINE PRODUCTS COMPANY, 185 N. Wabash Ave., Chicago 1, Ill., have available a new catalog section describing their dehydrators, dehydrator kits, charging hose, service cylinders and other products of the company. It is a four-page section of standard size, punched for inclusion in standard catalog loose leaf binders. Useful information contained in it is a digest of ICC refrigerant cylinder regulations.

B. F. GOODRICH CO., Akron, Ohio, has issued a new catalog section on its assortment of 44 light duty replacement V-belts and its combined assortment of V-belts and sheaves which is available upon request. The assortments consist of the most popular sizes and have been designed to facilitate merchandising of the product.

Descriptions of wall and floor racks which are offered with the assortments, together with display and merchandising aids which are furnished free to assist the retailer are included in the leaflet, together with an analysis of the light duty V-belt replacement market.

HANDY AND HARMON, 82 Fulton Street, New York, have a new bulletin No. 15 describing Easy-Flo 45, a recently announced silver brazing alloy with several new and exclusive features.

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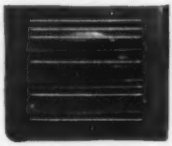

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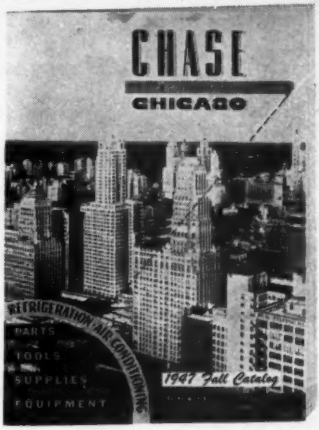

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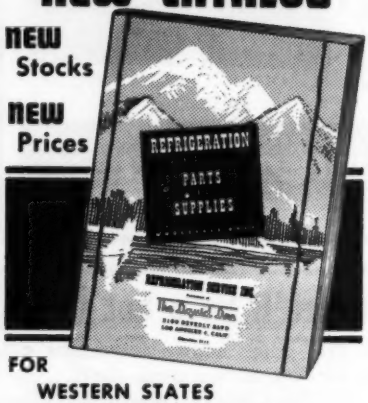

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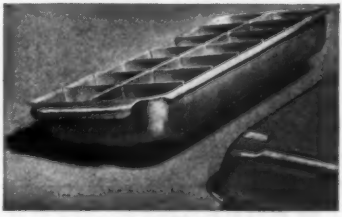

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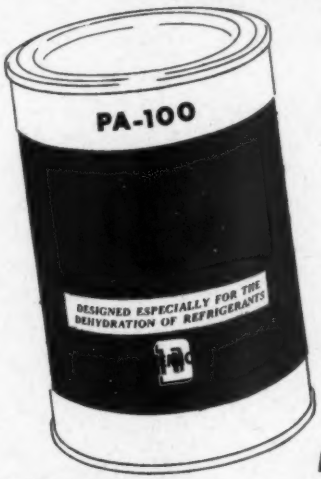

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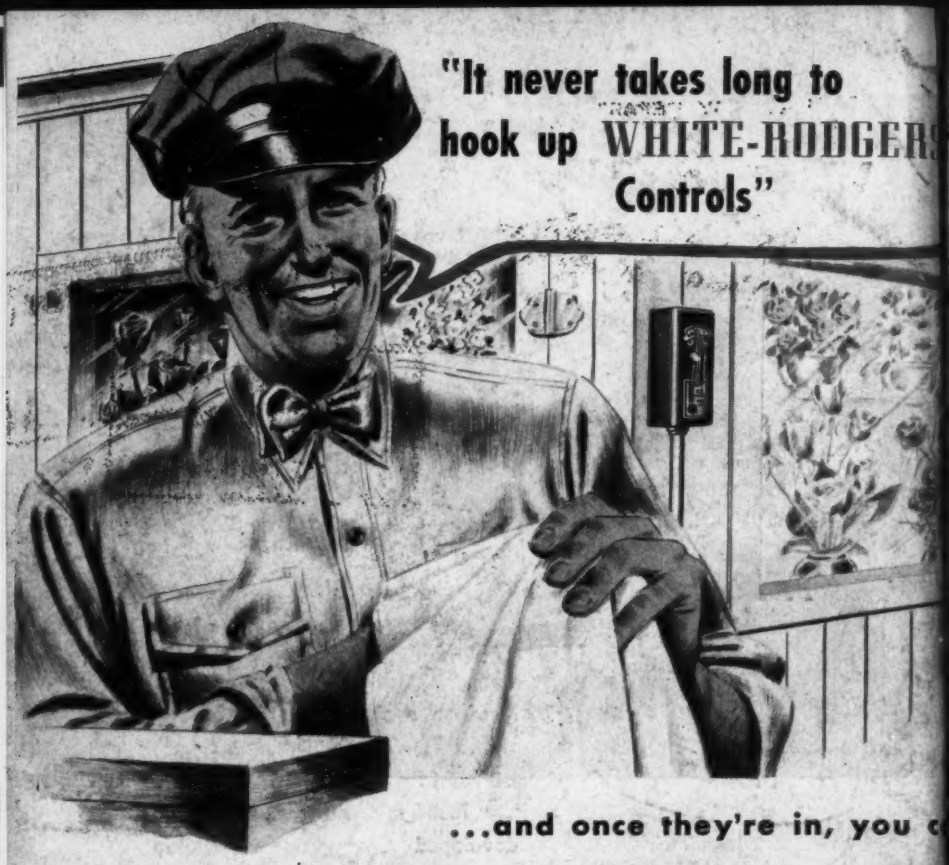

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